

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis

13715 Rider Trail North

Earth City, MO 63045

Tel: (314)298-8566

TestAmerica Job ID: 160-18613-1

Client Project/Site: ORNL Y-12 Outfall 200 Characterization

For:

Alliant Corporation

320 N Cedar Bluff Road

Suite 200

Knoxville, Tennessee 37923

Attn: Doug Milloway

Authorized for release by:

10/3/2016 11:33:57 AM

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Job ID: 160-18613-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Alliant Corporation

Project: ORNL Y-12 Outfall 200 Characterization

Report Number: 160-18613-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

Receipt

The samples were received on 8/12/2016 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 18.0° C.

Receipt Exceptions

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. TCLP Metals was not selected on the COC. The method was logged per client's sampling plan.

Comments

Please see the attached subcontract report for analyses at TestAmerica Richland.

General Chemistry

These concrete core samples were disaggregated, dried then puck milled and split for a variety of analyses. The possible heat generation may have compromised the Tritium, Carbon-14 and Technetium-99 native to these samples. YMTFA60 C (160-18613-1), YMTFA61 C

Case Narrative

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Job ID: 160-18613-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

POLYCHLORINATED BIPHENYLS (PCBs) WITH MULTI-INCREMENTAL PREPARATION

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Polychlorinated biphenyls (PCBs) with multi-incremental preparation in accordance with 8082A. The samples were leached on 08/16/2016, prepared on 08/23/2016 and analyzed on 08/24/2016.

Surrogate recovery for the following samples were outside control limits: YMTFA66 C (160-18613-6) and (160-18571-C-1-S MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

The matrix spike duplicate (MSD) recoveries for PCB-1260 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) and matrix spike (OMS) recoveries were within acceptance limits.

The matrix spike / matrix spike duplicate (MS/MSD) precision for PCB-1016 and PCB-1260 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

EPA Method 8082/8082A requires a minimum of 3 peaks to be used for PCB quantitation. Due to the presence of matrix interferences in the following sample, less than 5 peaks were used for quantitation.(160-18571-C-1-Q)

The %RPD between the primary and confirmation column exceeded 40% for PCB-1016 for the following samples: YMTFA54 C (160-18613-4). The lower values have been reported and qualified in accordance with the laboratory's SOP.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP METALS (ICP)

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Metals (ICP) in accordance with SW-846 Method 1311/6010C. The samples were leached on 08/16/2016, prepared on 08/24/2016 and analyzed on 08/29/2016.

The following sample(s) was diluted due to the nature of the sample matrix. Samples are high in salts: YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5), YMTFA66 C (160-18613-6) (160-18613-A-1-Q MS ^), (160-18613-A-1-R MSD) and (160-18613-A-1-P SD ^). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY (CVAA)

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Mercury (CVAA) in accordance with SW-846 Method 1311/7470A. The samples were leached on 08/16/2016, prepared on 08/24/2016 and analyzed on 08/25/2016.

The samples were re-digested/re-extracted due to a timer failure resulting in the samples digesting longer than permitted by the SOP. Therefore the MS/MSD was spiked after preservation. YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5), YMTFA66 C (160-18613-6), (160-18613-A-1-D MS) and (160-18613-A-1-D MSD)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TRITIUM

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Tritium in accordance with DOE. The samples were prepared on 08/19/2016 and 09/06/2016 and analyzed on 08/25/2016 and 09/07/2016.

Case Narrative

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Job ID: 160-18613-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

RADIUM-226 BY ALPHA SPECTROMETRY

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Radium-226 by Alpha Spectrometry in accordance with ST-RC-0301. The samples were dried on 08/12/2016, prepared on 09/09/2016 and analyzed on 09/17/2016.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6). The samples were of varying colors and contained rocks.

The sample duplicate precision (RER/RPD) associated with the following samples was outside of the control limits: (RER: 3.83, RPD: 115%). YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5), YMTFA66 C (160-18613-6), (LCS 160-268959/2-A), (MB 160-268959/1-A), (160-18590-A-1-O) and (160-18590-A-1-P DU). Non-homogeneity of the sample matrix is suspected. The data have been qualified and reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL BETA STRONTIUM (GFPC)

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Total Beta Strontium (GFPC) in accordance with SR-03-RC. The samples were dried on 08/12/2016, prepared on 08/22/2016 and analyzed on 08/25/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

TECHNETIUM-99 (LSC)

Samples YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5) and YMTFA66 C (160-18613-6) were analyzed for Technetium-99 (LSC) in accordance with TC_02_RC. The samples were prepared on 08/18/2016 and analyzed on 08/23/2016.

The following samples did not meet the detection goal of 1.00 pCi/g due to a high bias attributed to low tracer recoveries. The data have been qualified and reported. (160-18571-C-1-D DU)

The following sample has Tc-99 tracer recoveries below the 30% QC limit; (160-18571-C-1-D DU: 23.5%). The LCS (laboratory control sample) has an acceptable spike recovery demonstrating acceptable sample preparation and instrument performance. Matrix interference is suspected. The data have been qualified and reported.

The following samples counted off the upper end of the quench curve parameter (tSIE/AEC): YMTFA60 C (160-18613-1), YMTFA61 C (160-18613-2), YMTFA62 C (160-18613-3), YMTFA54 C (160-18613-4), YMTFA59 C (160-18613-5), YMTFA66 C (160-18613-6), (LCS 160-265424/2-A), (MB 160-265424/1-A), (160-18571-C-1-C) and (160-18571-C-1-D DU). A small amount (10 uL) of quenching agent (nitromethane) was added to the affected vials and recounted. The recount results were within the quench curve parameter and are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Earth City, MO 63045
Phone (314) 298-8566 Fax (314) 298-8757

Login Sample Receipt Checklist

Client: Alliant Corporation

Job Number: 160-18613-1

Login Number: 18613

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment	
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True		6
The cooler's custody seal, if present, is intact.	True		7
Sample custody seals, if present, are intact.	N/A		8
The cooler or samples do not appear to have been compromised or tampered with.	True		9
Samples were received on ice.	False	Client instructed the lab to proceed.	10
Cooler Temperature is acceptable.	False	Client instructed the lab to proceed.	11
Cooler Temperature is recorded.	True		12
COC is present.	True		13
COC is filled out in ink and legible.	True		14
COC is filled out with all pertinent information.	False	Requested analyses (TCLP metals) are not listed on COC	15
Is the Field Sampler's name present on COC?	N/A		
There are no discrepancies between the containers received and the COC.	True		
Samples are received within Holding Time (excluding tests with immediate HTs)	True		
Sample containers have legible labels.	True		
Containers are not broken or leaking.	True		
Sample collection date/times are provided.	True		
Appropriate sample containers are used.	True		
Sample bottles are completely filled.	True		
Sample Preservation Verified.	True		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A		
Multiphasic samples are not present.	True		
Samples do not require splitting or compositing.	True		
Residual Chlorine Checked.	N/A		

Definitions/Glossary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S	Surrogate is outside control limits
*	MS/MSD RPD exceeded the control limit
N	MS, MSD: Spike recovery is outside acceptance limits.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

Metals

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

Rad

Qualifier	Qualifier Description
S	Tracer is outside acceptance limits.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL SL
6010C	TCLP Metals (ICP)	SW846	TAL SL
7470A	Mercury (TCLP)	SW846	TAL SL
H3-04-RC	Tritium (LSC)	DOE	TAL SL
SR-03-RC	Total Beta Strontium (GFPC)	DOE	TAL SL
ST-RC-0301	Radium-226 (Alpha Spectrometry)	TAL-STL	TAL SL
TC-02-RC	Technetium-99 (LSC)	DOE	TAL SL
Am-241	General Sub Contract Method	NONE	TAL RCH
C-14	General Sub Contract Method	NONE	TAL RCH
Np-237	General Sub Contract Method	NONE	TAL RCH
Pu-238,	General Sub Contract Method	NONE	TAL RCH
Pu-239/240			
Th-228, Th-230,	General Sub Contract Method	NONE	TAL RCH
Th-232			
U-233/234,	General Sub Contract Method	NONE	TAL RCH
U-235/236, U-238			

Protocol References:

DOE = U.S. Department of Energy

NONE = NONE

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18613-1	YMTFA60 C	Solid	08/11/16 13:30	08/12/16 09:15
160-18613-2	YMTFA61 C	Solid	08/11/16 13:28	08/12/16 09:15
160-18613-3	YMTFA62 C	Solid	08/11/16 13:25	08/12/16 09:15
160-18613-4	YMTFA54 C	Solid	08/11/16 13:35	08/12/16 09:15
160-18613-5	YMTFA59 C	Solid	08/11/16 15:30	08/12/16 09:15
160-18613-6	YMTFA66 C	Solid	08/11/16 16:30	08/12/16 09:15

Detection Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA60 C

Lab Sample ID: 160-18613-1

Sample Analysis Not Complete.

Client Sample ID: YMTFA61 C

Lab Sample ID: 160-18613-2

Sample Analysis Not Complete.

Client Sample ID: YMTFA62 C

Lab Sample ID: 160-18613-3

Sample Analysis Not Complete.

Client Sample ID: YMTFA54 C

Lab Sample ID: 160-18613-4

Sample Analysis Not Complete.

Client Sample ID: YMTFA59 C

Lab Sample ID: 160-18613-5

Sample Analysis Not Complete.

Client Sample ID: YMTFA66 C

Lab Sample ID: 160-18613-6

Sample Analysis Not Complete.

This Detection Summary does not include radiochemical test results.

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA60 C

Lab Sample ID: 160-18613-1

Matrix: Solid

Date Collected: 08/11/16 13:30

Date Received: 08/12/16 09:15

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1221	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1232	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1242	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1248	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1254	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1260	0.052		0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1262	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
PCB-1268	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
Polychlorinated biphenyls, Total	0.052		0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:05	1
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89			23 - 146			08/23/16 10:23	08/24/16 16:05	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.050	U	0.13	0.050	mg/L		08/24/16 16:41	08/29/16 21:13	5
Barium	0.20	J	0.63	0.19	mg/L		08/24/16 16:41	08/29/16 21:13	5
Cadmium	0.019	U	0.063	0.019	mg/L		08/24/16 16:41	08/29/16 21:13	5
Chromium	0.040	J	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:13	5
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:13	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 21:13	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:13	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000079	U	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:01	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Tritium	0.146	U	0.176	0.176	1.00	0.287	pCi/g	08/19/16 14:09	08/25/16 07:20	1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Strontium 89/90	0.116	U	0.133	0.134	3.00	0.219	pCi/g	08/22/16 21:29	08/25/16 13:55	1
Carrier	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Sr Carrier	82.9			40 - 110				08/22/16 21:29	08/25/16 13:55	1

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.746		0.135	0.149	1.00	0.0184	pCi/g	09/09/16 18:00	09/17/16 14:00	1
Tracer	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
At-217	60.7			30 - 110				09/09/16 18:00	09/17/16 14:00	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA60 C

Date Collected: 08/11/16 13:30

Date Received: 08/12/16 09:15

Lab Sample ID: 160-18613-1

Matrix: Solid

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Technetium-99	-0.0788	U	0.244	0.244	1.00	0.430	pCi/g	08/18/16 11:40	08/23/16 20:09	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Tc-99m	92.8		30 - 110					08/18/16 11:40	08/23/16 20:09	1

Client Sample ID: YMTFA61 C

Date Collected: 08/11/16 13:28

Date Received: 08/12/16 09:15

Lab Sample ID: 160-18613-2

Matrix: Solid

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
							Prepared	Analyzed	
PCB-1016	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1221	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1232	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1242	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1248	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1254	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1260	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1262	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
PCB-1268	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
Polychlorinated biphenyls, Total	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 16:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		23 - 146				08/23/16 10:23	08/24/16 16:27	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
							Prepared	Analyzed	
Arsenic	0.050	U	0.13	0.050	mg/L		08/24/16 16:41	08/29/16 21:44	5
Barium	0.28	J	0.63	0.19	mg/L		08/24/16 16:41	08/29/16 21:44	5
Cadmium	0.019	U	0.063	0.019	mg/L		08/24/16 16:41	08/29/16 21:44	5
Chromium	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:44	5
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:44	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 21:44	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:44	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000079	U	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:15	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Tritium	0.0763	U	0.169	0.169	1.00	0.291	pCi/g	08/19/16 14:09	08/25/16 07:42	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

TestAmerica Job ID: 160-18613-1

Project/Site: ORNL Y-12 Outfall 200 Characterization

Client Sample ID: YMTFA61 C

Lab Sample ID: 160-18613-2

Date Collected: 08/11/16 13:28

Matrix: Solid

Date Received: 08/12/16 09:15

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Strontium 89/90	0.111	U		0.129	0.129	3.00	0.213	pCi/g	08/22/16 21:29	08/25/16 13:55
Carrier	%Yield	Qualifier	Limits						Prepared	Analyzed
Sr Carrier	87.2		40 - 110						08/22/16 21:29	08/25/16 13:55

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	0.634			0.116	0.128	1.00	0.0560	pCi/g	09/09/16 18:00	09/17/16 14:00
Tracer	%Yield	Qualifier	Limits						Prepared	Analyzed
At-217	74.7		30 - 110						09/09/16 18:00	09/17/16 14:00

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Technetium-99	-0.0299	U		0.267	0.267	1.00	0.464	pCi/g	08/18/16 11:40	08/23/16 20:30
Tracer	%Yield	Qualifier	Limits						Prepared	Analyzed
Tc-99m	79.4		30 - 110						08/18/16 11:40	08/23/16 20:30

Client Sample ID: YMTFA62 C

Lab Sample ID: 160-18613-3

Date Collected: 08/11/16 13:25

Matrix: Solid

Date Received: 08/12/16 09:15

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)					
PCB-1016	0.0095	U		0.033	0.0095	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1221	0.0095	U		0.033	0.0095	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1232	0.0095	U		0.033	0.0095	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1242	0.0095	U		0.033	0.0095	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1248	0.0095	U		0.033	0.0095	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1254	0.0079	U		0.033	0.0079	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1260	0.0079	U		0.033	0.0079	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1262	0.0079	U		0.033	0.0079	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
PCB-1268	0.0079	U		0.033	0.0079	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
Polychlorinated biphenyls, Total	0.0079	U		0.033	0.0079	mg/Kg	08/23/16 10:23	08/24/16 16:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	106		23 - 146				08/23/16 10:23	08/24/16 16:50	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)					
Arsenic	0.050	U		0.13	0.050	mg/L	08/24/16 16:41	08/29/16 21:49	5
Barium	0.29	J		0.63	0.19	mg/L	08/24/16 16:41	08/29/16 21:49	5
Cadmium	0.019	U		0.063	0.019	mg/L	08/24/16 16:41	08/29/16 21:49	5
Chromium	0.038	U		0.13	0.038	mg/L	08/24/16 16:41	08/29/16 21:49	5

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

TestAmerica Job ID: 160-18613-1

Project/Site: ORNL Y-12 Outfall 200 Characterization

Client Sample ID: YMTFA62 C

Lab Sample ID: 160-18613-3

Matrix: Solid

Date Collected: 08/11/16 13:25

Date Received: 08/12/16 09:15

Method: 6010C - TCLP Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:49	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 21:49	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:49	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00018	J	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:17	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Tritium	0.190	U	0.187	0.187	1.00	0.301	pCi/g	08/19/16 14:09	08/25/16 08:05	1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium 89/90	0.0933	U	0.127	0.127	3.00	0.212	pCi/g	08/22/16 21:29	08/25/16 13:54	1
<i>Carrier</i>										
Sr Carrier	89.3		40 - 110					08/22/16 21:29	08/25/16 13:54	1
<i>Prepared</i>										
<i>Analyzed</i>										

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.506		0.107	0.116	1.00	0.0648	pCi/g	09/09/16 18:00	09/17/16 14:00	1
<i>Tracer</i>										
At-217	67.5		30 - 110					09/09/16 18:00	09/17/16 14:00	1
<i>Prepared</i>										
<i>Analyzed</i>										
<i>Dil Fac</i>										

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Technetium-99	0.106	U	0.342	0.342	1.00	0.580	pCi/g	08/18/16 11:40	08/23/16 20:50	1
<i>Tracer</i>										
Tc-99m	64.5		30 - 110					08/18/16 11:40	08/23/16 20:50	1
<i>Prepared</i>										
<i>Analyzed</i>										
<i>Dil Fac</i>										

Client Sample ID: YMTFA54 C

Lab Sample ID: 160-18613-4

Matrix: Solid

Date Collected: 08/11/16 13:35

Date Received: 08/12/16 09:15

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.011	J	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1221	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1232	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1242	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1248	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:12	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA54 C

Lab Sample ID: 160-18613-4

Date Collected: 08/11/16 13:35

Matrix: Solid

Date Received: 08/12/16 09:15

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1254	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1260	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1262	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
PCB-1268	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:12	1
Polychlorinated biphenyls, Total	0.011	J	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:12	1

Surrogate

	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	83		23 - 146	08/23/16 10:23	08/24/16 17:12	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.050	U	0.13	0.050	mg/L		08/24/16 16:41	08/29/16 21:54	5
Barium	0.27	J	0.63	0.19	mg/L		08/24/16 16:41	08/29/16 21:54	5
Cadmium	0.019	U	0.063	0.019	mg/L		08/24/16 16:41	08/29/16 21:54	5
Chromium	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:54	5
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:54	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 21:54	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:54	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00019	J	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:19	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Tritium	-0.0132	U	0.195	0.195	1.00	0.367	pCi/g	09/06/16 14:53	09/07/16 10:39	1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Strontium 89/90	-0.149	U	0.136	0.137	3.00	0.267	pCi/g	08/22/16 21:29	08/25/16 13:54	1

Carrier

	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Sr Carrier	79.8		40 - 110	08/22/16 21:29	08/25/16 13:54	1

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	118		1.60	10.0	1.00	0.0419	pCi/g	09/09/16 18:00	09/17/16 14:00	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
At-217	64.5		30 - 110					09/09/16 18:00	09/17/16 14:00	1

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Technetium-99	0.0997	U	0.404	0.404	1.00	0.688	pCi/g	08/18/16 11:40	08/23/16 21:11	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Tracer	%Yield	Qualifier	Limits
Tc-99m	62.2		30 - 110

Prepared	Analyzed	Dil Fac
08/18/16 11:40	08/23/16 21:11	1

Client Sample ID: YMTFA59 C

Lab Sample ID: 160-18613-5

Date Collected: 08/11/16 15:30

Matrix: Solid

Date Received: 08/12/16 09:15

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1221	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1232	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1242	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1248	0.0095	U	0.033	0.0095	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1254	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1260	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1262	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
PCB-1268	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:35	1
Polychlorinated biphenyls, Total	0.0079	U	0.033	0.0079	mg/Kg		08/23/16 10:23	08/24/16 17:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	84		23 - 146	08/23/16 10:23	08/24/16 17:35	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.050	U	0.13	0.050	mg/L		08/24/16 16:41	08/29/16 21:58	5
Barium	0.36	J	0.63	0.19	mg/L		08/24/16 16:41	08/29/16 21:58	5
Cadmium	0.019	U	0.063	0.019	mg/L		08/24/16 16:41	08/29/16 21:58	5
Chromium	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:58	5
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:58	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 21:58	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 21:58	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	J	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:21	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Tritium	0.0390	U	0.195	0.195	1.00	0.344	pCi/g	09/06/16 14:53	09/07/16 05:57	1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Strontium 89/90	0.0273	U	0.110	0.110	3.00	0.194	pCi/g	08/22/16 21:29	08/25/16 13:54	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Sr Carrier	88.3		40 - 110	08/22/16 21:29	08/25/16 13:54	1

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	3.96		0.305	0.451	1.00	0.0712	pCi/g	09/09/16 18:00	09/17/16 14:00	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA59 C

Date Collected: 08/11/16 15:30

Date Received: 08/12/16 09:15

Lab Sample ID: 160-18613-5

Matrix: Solid

Tracer	%Yield	Qualifier	Limits
At-217	66.9		30 - 110

Prepared	Analyzed	Dil Fac
09/09/16 18:00	09/17/16 14:00	1

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Technetium-99	-0.0272	U	0.486	0.486	1.00	0.842	pCi/g	08/18/16 11:40	08/23/16 21:32	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Tc-99m	51.3		30 - 110					08/18/16 11:40	08/23/16 21:32	1

Client Sample ID: YMTFA66 C

Date Collected: 08/11/16 16:30

Date Received: 08/12/16 09:15

Lab Sample ID: 160-18613-6

Matrix: Solid

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1221	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1232	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1242	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1248	0.0096	U	0.033	0.0096	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1254	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1260	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1262	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
PCB-1268	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
Polychlorinated biphenyls, Total	0.0080	U	0.033	0.0080	mg/Kg		08/23/16 10:23	08/24/16 17:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surrogate)	4	S	23 - 146				08/23/16 10:23	08/24/16 17:57	1

Method: 6010C - TCLP Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.050	U	0.13	0.050	mg/L		08/24/16 16:41	08/29/16 22:03	5
Barium	0.33	J	0.63	0.19	mg/L		08/24/16 16:41	08/29/16 22:03	5
Cadmium	0.019	U	0.063	0.019	mg/L		08/24/16 16:41	08/29/16 22:03	5
Chromium	0.051	J	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 22:03	5
Lead	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 22:03	5
Selenium	0.063	U	0.19	0.063	mg/L		08/24/16 16:41	08/29/16 22:03	5
Silver	0.038	U	0.13	0.038	mg/L		08/24/16 16:41	08/29/16 22:03	5

Method: 7470A - Mercury (TCLP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	J	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 09:23	1

Method: H3-04-RC - Tritium (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Tritium	-0.00240	U	0.190	0.190	1.00	0.344	pCi/g	09/06/16 14:53	09/07/16 06:42	1

TestAmerica St. Louis

Client Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Client Sample ID: YMTFA66 C

Date Collected: 08/11/16 16:30

Date Received: 08/12/16 09:15

Lab Sample ID: 160-18613-6

Matrix: Solid

Method: SR-03-RC - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Strontium 89/90	0.0402	U	0.113	0.113	3.00	0.196	pCi/g	08/22/16 21:29	08/25/16 13:54	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	88.3		40 - 110					08/22/16 21:29	08/25/16 13:54	1

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	0.723		0.127	0.141	1.00	0.0168	pCi/g	09/09/16 18:00	09/17/16 14:00	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
At-217	65.9		30 - 110					09/09/16 18:00	09/17/16 14:00	1

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Technetium-99	0.0334	U	0.253	0.253	1.00	0.434	pCi/g	08/18/16 11:40	08/23/16 21:53	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Tc-99m	95.1		30 - 110					08/18/16 11:40	08/23/16 21:53	1

TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-266064/1-A

Matrix: Solid

Analysis Batch: 266183

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 266064

Analyte	MB		RL	MDL	Unit	D	Prepared		Analyzed	Dil Fac
	Result	Qualifier					Prepared	Analyzed		
PCB-1016	0.0096	U	0.033	0.0096	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1221	0.0096	U	0.033	0.0096	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1232	0.0096	U	0.033	0.0096	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1242	0.0096	U	0.033	0.0096	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1248	0.0096	U	0.033	0.0096	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1254	0.0080	U	0.033	0.0080	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1260	0.0080	U	0.033	0.0080	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1262	0.0080	U	0.033	0.0080	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
PCB-1268	0.0080	U	0.033	0.0080	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	
Polychlorinated biphenyls, Total	0.0080	U	0.033	0.0080	mg/Kg	08/23/16 10:23	08/24/16 11:34		1	

MB MB

Surrogate	%Recovery		Qualifier	Limits	Prepared	Analyzed	Dil Fac
	94						
DCB Decachlorobiphenyl (Sur)				23 - 146	08/23/16 10:23	08/24/16 11:34	1

Lab Sample ID: LCS 160-266064/2-A

Matrix: Solid

Analysis Batch: 266183

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 266064

Analyte	Spike Added	LCS		Unit	D	%Rec	%Rec.	Limits
		Result	Qualifier					
PCB-1016	0.167	0.148		mg/Kg		89	52 - 134	
PCB-1260	0.167	0.150		mg/Kg		90	50 - 132	

Surrogate	LCS		Limits	%Rec.
	%Recovery	Qualifier		
DCB Decachlorobiphenyl (Sur)	100		23 - 146	

Lab Sample ID: 160-18571-C-1-R MS

Matrix: Solid

Analysis Batch: 266183

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 266064

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	Limits
				Result	Qualifier				
PCB-1016	0.0096	U	0.166	0.0897		mg/Kg		54	23 - 140
PCB-1260	0.0080	U	0.166	0.0927		mg/Kg		56	20 - 131

Surrogate	MS		Limits	%Rec.
	%Recovery	Qualifier		
DCB Decachlorobiphenyl (Sur)	68		23 - 146	

Lab Sample ID: 160-18571-C-1-S MSD

Matrix: Solid

Analysis Batch: 266183

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 266064

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	Limits	RPD
				Result	Qualifier					
PCB-1016	0.0096	U	0.165	0.218	*	mg/Kg		132	23 - 140	83
PCB-1260	0.0080	U	0.165	0.232	N *	mg/Kg		140	20 - 131	86

Surrogate	MSD		Limits	%Rec.
	%Recovery	Qualifier		
DCB Decachlorobiphenyl (Sur)	154	S	23 - 146	

TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: 6010C - TCLP Metals (ICP)

Lab Sample ID: LB 160-265574/1-C

Matrix: Solid

Analysis Batch: 267177

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 266424

Analyte	LB	LB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	0.010	U	0.025	0.010	mg/L	08/24/16 16:41	08/29/16 21:04		1
Barium	0.038	U	0.13	0.038	mg/L	08/24/16 16:41	08/29/16 21:04		1
Cadmium	0.0038	U	0.013	0.0038	mg/L	08/24/16 16:41	08/29/16 21:04		1
Chromium	0.0075	U	0.025	0.0075	mg/L	08/24/16 16:41	08/29/16 21:04		1
Lead	0.0075	U	0.025	0.0075	mg/L	08/24/16 16:41	08/29/16 21:04		1
Selenium	0.013	U	0.038	0.013	mg/L	08/24/16 16:41	08/29/16 21:04		1
Silver	0.0075	U	0.025	0.0075	mg/L	08/24/16 16:41	08/29/16 21:04		1

Lab Sample ID: LCS 160-266424/2-A

Matrix: Solid

Analysis Batch: 267177

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 266424

%Rec.

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits
		Result	Qualifier				
Arsenic	2.50	2.35		mg/L	94	80 - 120	
Barium	2.50	2.33		mg/L	93	80 - 120	
Cadmium	2.50	2.45		mg/L	98	80 - 120	
Chromium	2.50	2.54		mg/L	102	80 - 120	
Lead	2.50	2.60		mg/L	104	80 - 120	
Selenium	1.25	1.31		mg/L	105	80 - 120	
Silver	0.500	0.505		mg/L	101	80 - 120	

Lab Sample ID: 160-18613-1 MS

Matrix: Solid

Analysis Batch: 267177

Client Sample ID: YMTFA60 C

Prep Type: Total/NA

Prep Batch: 266424

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	0.050	U	2.50	2.41		mg/L	96	75 - 125	
Barium	0.20	J	2.50	2.54		mg/L	94	75 - 125	
Cadmium	0.019	U	2.50	2.53		mg/L	101	75 - 125	
Chromium	0.040	J	2.50	2.59		mg/L	102	75 - 125	
Lead	0.038	U	2.50	2.62		mg/L	105	75 - 125	
Selenium	0.063	U	1.25	1.28		mg/L	102	75 - 125	
Silver	0.038	U	0.500	0.508		mg/L	102	75 - 125	

Lab Sample ID: 160-18613-1 MSD

Matrix: Solid

Analysis Batch: 267177

Client Sample ID: YMTFA60 C

Prep Type: Total/NA

Prep Batch: 266424

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	0.050	U	2.50	2.44		mg/L	97	75 - 125		1	20
Barium	0.20	J	2.50	2.53		mg/L	93	75 - 125		0	20
Cadmium	0.019	U	2.50	2.53		mg/L	101	75 - 125		0	20
Chromium	0.040	J	2.50	2.59		mg/L	102	75 - 125		0	20
Lead	0.038	U	2.50	2.62		mg/L	105	75 - 125		0	20
Selenium	0.063	U	1.25	1.30		mg/L	104	75 - 125		2	20
Silver	0.038	U	0.500	0.501		mg/L	100	75 - 125		1	20

TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: 7470A - Mercury (TCLP)

Lab Sample ID: LB 160-266377/1-A

Matrix: Solid

Analysis Batch: 266547

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 266377

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000079	U	0.0010	0.000079	mg/L		08/24/16 12:29	08/25/16 08:56	1

Lab Sample ID: LCS 160-266377/2-A

Matrix: Solid

Analysis Batch: 266547

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 266377

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Mercury	0.0250	0.0245		mg/L		98	80 - 120

Lab Sample ID: 160-18613-1 MS

Matrix: Solid

Analysis Batch: 266547

Client Sample ID: YMTFA60 C

Prep Type: Total/NA

Prep Batch: 266377

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Mercury	0.000079	U	0.0250	0.0255		mg/L		102	70 - 130

Lab Sample ID: 160-18613-1 MSD

Matrix: Solid

Analysis Batch: 266547

Client Sample ID: YMTFA60 C

Prep Type: Total/NA

Prep Batch: 266377

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	RPD	Limit
Mercury	0.000079	U	0.0250	0.0248		mg/L		99	70 - 130	3	20

Method: H3-04-RC - Tritium (LSC)

Lab Sample ID: MB 160-265698/1-A

Matrix: Solid

Analysis Batch: 266523

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 265698

Analyte	MB Result	MB Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Tritium	0.1469	U	0.178	0.178	1.00	0.292	pCi/g	08/19/16 14:09	08/25/16 03:10	1

Lab Sample ID: LCS 160-265698/2-A

Matrix: Solid

Analysis Batch: 266523

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 265698

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec.	Limits
				Uncert. (2σ+/-)					
Tritium	10.1	8.977		1.01	1.00	0.299	pCi/g	89	80 - 114

Lab Sample ID: 160-18591-B-4-G MS

Matrix: Solid

Analysis Batch: 266523

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 265698

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total	Uncert. (2σ+/-)	RL	MDC	Unit	%Rec.	Limits
						Uncert. (2σ+/-)						
Tritium	-0.00067	U	10.1	9.132		1.05	1.00	0.332	pCi/g		90	78 - 122

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TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: H3-04-RC - Tritium (LSC) (Continued)

Lab Sample ID: 160-18591-B-3-G DU

Matrix: Solid

Analysis Batch: 266523

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 265698

Analyte	Sample	Sample	DU	DU	Total	RER	Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)		
Tritium	0.0519	U	0.1120	U	0.202	1.00	0.15
						0.346 pCi/g	1

Lab Sample ID: MB 160-268217/1-A

Matrix: Solid

Analysis Batch: 268284

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 268217

Analyte	MB	MB	Count	Total	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)			
Tritium	-0.04563	U	0.188	0.188	1.00	09/06/16 14:53	09/07/16 04:26
					0.350 pCi/g		1

Lab Sample ID: LCS 160-268217/2-A

Matrix: Solid

Analysis Batch: 268403

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 268217

Analyte	Spike	LCS	LCS	Total	%Rec.	Limits
	Added	Result	Qual	Uncert. (2σ+/-)		
Tritium	10.1	10.12		1.11	1.00	0.317 pCi/g
					%Rec	80 - 114

Lab Sample ID: 160-18613-5 MS

Matrix: Solid

Analysis Batch: 268284

Client Sample ID: YMTFA59 C

Prep Type: Total/NA

Prep Batch: 268217

Analyte	Sample	Sample	Spike	MS	MS	Total	%Rec.	Limits
	Result	Qual	Added	Result	Qual	Uncert. (2σ+/-)		
Tritium	0.0390	U	10.1	9.103		1.03	1.00	0.353 pCi/g
							90	78 - 122

Lab Sample ID: 160-18613-4 DU

Matrix: Solid

Analysis Batch: 268403

Client Sample ID: YMTFA54 C

Prep Type: Total/NA

Prep Batch: 268217

Analyte	Sample	Sample	DU	DU	Total	RER	Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)		
Tritium	-0.0132	U	0.1057	U	0.190	1.00	0.323 pCi/g
						0.201	1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-266028/1-A

Matrix: Solid

Analysis Batch: 266511

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 266028

Analyte	MB	MB	Count	Total	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)			
Strontium 89/90	0.05486	U	0.117	0.117	3.00	0.201	0.31
Carrier	MB	MB					
Sr Carrier	%Yield	Qualifier	Limits		Prepared	Analyzed	Dil Fac
	91.6		40 - 110		08/22/16 21:29	08/25/16 13:51	1

TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: SR-03-RC - Total Beta Strontium (GFPC) (Continued)

Lab Sample ID: LCS 160-266028/2-A

Matrix: Solid

Analysis Batch: 266490

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 266028

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		RL	MDC	Unit	%Rec	%Rec.Limits
		Result	Qual		(2σ+/-)	RL					
Strontium 89/90	8.60	6.794		0.633	3.00	0.208	pCi/g	79	75 - 125		
<i>Carrier</i>											
Sr Carrier	88.9			40 - 110							

Lab Sample ID: 160-18613-6 DU

Matrix: Solid

Analysis Batch: 266490

Client Sample ID: YMTFA66 C

Prep Type: Total/NA

Prep Batch: 266028

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)	RL					
Strontium 89/90	0.0402	U	-0.00952	U	0.104	3.00	0.190	pCi/g		0.23	1
<i>Carrier</i>											
Sr Carrier	88.7		40 - 110								

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Lab Sample ID: MB 160-268959/1-A

Matrix: Solid

Analysis Batch: 270441

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 268959

Analyte	MB		Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC						
Radium-226	0.2498		0.0800	0.0827	1.00	0.0192	pCi/g	09/09/16 18:00	09/17/16 14:00			1
<i>Tracer</i>												
At-217	55.0		30 - 110					09/09/16 18:00	09/17/16 14:00			1

Lab Sample ID: LCS 160-268959/2-A

Matrix: Solid

Analysis Batch: 270442

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 268959

Analyte	Spike		LCS		Total		RL	MDC	Unit	%Rec	%Rec.Limits
	Added	Result	Result	Qual	Uncert. (2σ+/-)	RL					
Radium-226	12.1	12.54			1.17	1.00	0.0504	pCi/g	104	70 - 130	
<i>Tracer</i>											
At-217	69.9		30 - 110								

TestAmerica St. Louis

QC Sample Results

Client: Alliant Corporation

TestAmerica Job ID: 160-18613-1

Project/Site: ORNL Y-12 Outfall 200 Characterization

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-18590-A-1-P DU

Matrix: Solid

Analysis Batch: 270648

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 268959

Analyte	Sample		DU		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	Uncert.							
Radium-226	0.589		2.169		0.284		1.00	0.0519	pCi/g			3.83	1
<i>Tracer</i>													
At-217	68.6				30 - 110								

Method: TC-02-RC - Technetium-99 (LSC)

Lab Sample ID: MB 160-265424/1-A

Matrix: Solid

Analysis Batch: 266343

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 265424

Analyte	MB		Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	(2σ+/-)	Uncert.	(2σ+/-)						
Technetium-99	0.1678	U	0.261		0.262		1.00	0.436	pCi/g	08/18/16 11:40	08/23/16 16:19	1
<i>Tracer</i>												
Tc-99m	107			30 - 110						Prepared	Analyzed	Dil Fac
										08/18/16 11:40	08/23/16 16:19	1

Lab Sample ID: LCS 160-265424/2-A

Matrix: Solid

Analysis Batch: 266343

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 265424

Analyte	Spike		LCS		Total		RL	MDC	Unit	%Rec	Limits
	Added	Result	Result	Qual	Uncert.	(2σ+/-)					
Technetium-99		34.5	32.23		3.26		1.00	0.459	pCi/g	93	75 - 125
<i>Tracer</i>											
Tc-99m	102			30 - 110							

Lab Sample ID: 160-18571-C-1-D DU

Matrix: Solid

Analysis Batch: 266388

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 265424

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert.	(2σ+/-)					
Technetium-99	0.0971	U	-0.2793	U	0.719		1.00	1.24	pCi/g		0.25
<i>Tracer</i>											
Tc-99m	23.5	S	30 - 110								

TestAmerica St. Louis

QC Association Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

GC Semi VOA

ISM Prep Batch: 265251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	Increment, Prep	
160-18613-2	YMTFA61 C	Total/NA	Solid	Increment, Prep	
160-18613-3	YMTFA62 C	Total/NA	Solid	Increment, Prep	
160-18613-4	YMTFA54 C	Total/NA	Solid	Increment, Prep	
160-18613-5	YMTFA59 C	Total/NA	Solid	Increment, Prep	
160-18613-6	YMTFA66 C	Total/NA	Solid	Increment, Prep	
160-18571-C-1-R MS	Matrix Spike	Total/NA	Solid	Increment, Prep	
160-18571-C-1-S MSD	Matrix Spike Duplicate	Total/NA	Solid	Increment, Prep	

Prep Batch: 266064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	3550C	265251
160-18613-2	YMTFA61 C	Total/NA	Solid	3550C	265251
160-18613-3	YMTFA62 C	Total/NA	Solid	3550C	265251
160-18613-4	YMTFA54 C	Total/NA	Solid	3550C	265251
160-18613-5	YMTFA59 C	Total/NA	Solid	3550C	265251
160-18613-6	YMTFA66 C	Total/NA	Solid	3550C	265251
MB 160-266064/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 160-266064/2-A	Lab Control Sample	Total/NA	Solid	3550C	
160-18571-C-1-R MS	Matrix Spike	Total/NA	Solid	3550C	265251
160-18571-C-1-S MSD	Matrix Spike Duplicate	Total/NA	Solid	3550C	265251

Analysis Batch: 266183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	8082A	266064
160-18613-2	YMTFA61 C	Total/NA	Solid	8082A	266064
160-18613-3	YMTFA62 C	Total/NA	Solid	8082A	266064
160-18613-4	YMTFA54 C	Total/NA	Solid	8082A	266064
160-18613-5	YMTFA59 C	Total/NA	Solid	8082A	266064
160-18613-6	YMTFA66 C	Total/NA	Solid	8082A	266064
MB 160-266064/1-A	Method Blank	Total/NA	Solid	8082A	266064
LCS 160-266064/2-A	Lab Control Sample	Total/NA	Solid	8082A	266064
160-18571-C-1-R MS	Matrix Spike	Total/NA	Solid	8082A	266064
160-18571-C-1-S MSD	Matrix Spike Duplicate	Total/NA	Solid	8082A	266064

Metals

ISM Prep Batch: 265251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	Increment, Prep	
160-18613-2	YMTFA61 C	Total/NA	Solid	Increment, Prep	
160-18613-3	YMTFA62 C	Total/NA	Solid	Increment, Prep	
160-18613-4	YMTFA54 C	Total/NA	Solid	Increment, Prep	
160-18613-5	YMTFA59 C	Total/NA	Solid	Increment, Prep	
160-18613-6	YMTFA66 C	Total/NA	Solid	Increment, Prep	
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	Increment, Prep	
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	Increment, Prep	

TestAmerica St. Louis

QC Association Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Metals (Continued)

Leach Batch: 265574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	1311	265251
160-18613-2	YMTFA61 C	Total/NA	Solid	1311	265251
160-18613-3	YMTFA62 C	Total/NA	Solid	1311	265251
160-18613-4	YMTFA54 C	Total/NA	Solid	1311	265251
160-18613-5	YMTFA59 C	Total/NA	Solid	1311	265251
160-18613-6	YMTFA66 C	Total/NA	Solid	1311	265251
LB 160-265574/1-C	Method Blank	Total/NA	Solid	1311	
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	1311	265251
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	1311	265251

Prep Batch: 266377

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	7470A	265574
160-18613-2	YMTFA61 C	Total/NA	Solid	7470A	265574
160-18613-3	YMTFA62 C	Total/NA	Solid	7470A	265574
160-18613-4	YMTFA54 C	Total/NA	Solid	7470A	265574
160-18613-5	YMTFA59 C	Total/NA	Solid	7470A	265574
160-18613-6	YMTFA66 C	Total/NA	Solid	7470A	265574
LB 160-266377/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 160-266377/2-A	Lab Control Sample	Total/NA	Solid	7470A	
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	7470A	265574
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	7470A	265574

Prep Batch: 266424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	3010A	265574
160-18613-2	YMTFA61 C	Total/NA	Solid	3010A	265574
160-18613-3	YMTFA62 C	Total/NA	Solid	3010A	265574
160-18613-4	YMTFA54 C	Total/NA	Solid	3010A	265574
160-18613-5	YMTFA59 C	Total/NA	Solid	3010A	265574
160-18613-6	YMTFA66 C	Total/NA	Solid	3010A	265574
LB 160-265574/1-C	Method Blank	Total/NA	Solid	3010A	265574
LCS 160-266424/2-A	Lab Control Sample	Total/NA	Solid	3010A	
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	3010A	265574
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	3010A	265574

Analysis Batch: 266547

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	7470A	266377
160-18613-2	YMTFA61 C	Total/NA	Solid	7470A	266377
160-18613-3	YMTFA62 C	Total/NA	Solid	7470A	266377
160-18613-4	YMTFA54 C	Total/NA	Solid	7470A	266377
160-18613-5	YMTFA59 C	Total/NA	Solid	7470A	266377
160-18613-6	YMTFA66 C	Total/NA	Solid	7470A	266377
LB 160-266377/1-A	Method Blank	Total/NA	Solid	7470A	266377
LCS 160-266377/2-A	Lab Control Sample	Total/NA	Solid	7470A	266377
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	7470A	266377
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	7470A	266377

TestAmerica St. Louis

QC Association Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Metals (Continued)

Analysis Batch: 267177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	6010C	266424
160-18613-2	YMTFA61 C	Total/NA	Solid	6010C	266424
160-18613-3	YMTFA62 C	Total/NA	Solid	6010C	266424
160-18613-4	YMTFA54 C	Total/NA	Solid	6010C	266424
160-18613-5	YMTFA59 C	Total/NA	Solid	6010C	266424
160-18613-6	YMTFA66 C	Total/NA	Solid	6010C	266424
LB 160-265574/1-C	Method Blank	Total/NA	Solid	6010C	266424
LCS 160-266424/2-A	Lab Control Sample	Total/NA	Solid	6010C	266424
160-18613-1 MS	YMTFA60 C	Total/NA	Solid	6010C	266424
160-18613-1 MSD	YMTFA60 C	Total/NA	Solid	6010C	266424

Rad

Leach Batch: 264517

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18590-A-1-P DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 264650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	Dry and Grind	
160-18613-2	YMTFA61 C	Total/NA	Solid	Dry and Grind	
160-18613-3	YMTFA62 C	Total/NA	Solid	Dry and Grind	
160-18613-4	YMTFA54 C	Total/NA	Solid	Dry and Grind	
160-18613-5	YMTFA59 C	Total/NA	Solid	Dry and Grind	
160-18613-6	YMTFA66 C	Total/NA	Solid	Dry and Grind	
160-18613-6 DU	YMTFA66 C	Total/NA	Solid	Dry and Grind	

Prep Batch: 265424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	Ext_Chrom_LSC	
160-18613-2	YMTFA61 C	Total/NA	Solid	Ext_Chrom_LSC	
160-18613-3	YMTFA62 C	Total/NA	Solid	Ext_Chrom_LSC	
160-18613-4	YMTFA54 C	Total/NA	Solid	Ext_Chrom_LSC	
160-18613-5	YMTFA59 C	Total/NA	Solid	Ext_Chrom_LSC	
160-18613-6	YMTFA66 C	Total/NA	Solid	Ext_Chrom_LSC	
MB 160-265424/1-A	Method Blank	Total/NA	Solid	Ext_Chrom_LSC	
LCS 160-265424/2-A	Lab Control Sample	Total/NA	Solid	Ext_Chrom_LSC	
160-18571-C-1-D DU	Duplicate	Total/NA	Solid	Ext_Chrom_LSC	

Prep Batch: 265698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	LSC_Dist_Susp	
160-18613-2	YMTFA61 C	Total/NA	Solid	LSC_Dist_Susp	
160-18613-3	YMTFA62 C	Total/NA	Solid	LSC_Dist_Susp	
MB 160-265698/1-A	Method Blank	Total/NA	Solid	LSC_Dist_Susp	
LCS 160-265698/2-A	Lab Control Sample	Total/NA	Solid	LSC_Dist_Susp	
160-18591-B-4-G MS	Matrix Spike	Total/NA	Solid	LSC_Dist_Susp	
160-18591-B-3-G DU	Duplicate	Total/NA	Solid	LSC_Dist_Susp	

TestAmerica St. Louis

QC Association Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Rad (Continued)

Prep Batch: 266028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	DPS-0	264650
160-18613-2	YMTFA61 C	Total/NA	Solid	DPS-0	264650
160-18613-3	YMTFA62 C	Total/NA	Solid	DPS-0	264650
160-18613-4	YMTFA54 C	Total/NA	Solid	DPS-0	264650
160-18613-5	YMTFA59 C	Total/NA	Solid	DPS-0	264650
160-18613-6	YMTFA66 C	Total/NA	Solid	DPS-0	264650
MB 160-266028/1-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-266028/2-A	Lab Control Sample	Total/NA	Solid	DPS-0	
160-18613-6 DU	YMTFA66 C	Total/NA	Solid	DPS-0	264650

Prep Batch: 268217

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-4	YMTFA54 C	Total/NA	Solid	LSC_Dist_Susp	
160-18613-5	YMTFA59 C	Total/NA	Solid	LSC_Dist_Susp	
160-18613-6	YMTFA66 C	Total/NA	Solid	LSC_Dist_Susp	
MB 160-268217/1-A	Method Blank	Total/NA	Solid	LSC_Dist_Susp	
LCS 160-268217/2-A	Lab Control Sample	Total/NA	Solid	LSC_Dist_Susp	
160-18613-5 MS	YMTFA59 C	Total/NA	Solid	LSC_Dist_Susp	
160-18613-4 DU	YMTFA54 C	Total/NA	Solid	LSC_Dist_Susp	

Prep Batch: 268959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18613-1	YMTFA60 C	Total/NA	Solid	DPS-0	264650
160-18613-2	YMTFA61 C	Total/NA	Solid	DPS-0	264650
160-18613-3	YMTFA62 C	Total/NA	Solid	DPS-0	264650
160-18613-4	YMTFA54 C	Total/NA	Solid	DPS-0	264650
160-18613-5	YMTFA59 C	Total/NA	Solid	DPS-0	264650
160-18613-6	YMTFA66 C	Total/NA	Solid	DPS-0	264650
MB 160-268959/1-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-268959/2-A	Lab Control Sample	Total/NA	Solid	DPS-0	
160-18590-A-1-P DU	Duplicate	Total/NA	Solid	DPS-0	264517

Surrogate Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
		DCB2					
Lab Sample ID	Client Sample ID	(23-146)					
160-18571-C-1-R MS	Matrix Spike	68					
160-18613-4	YMTFA54 C	83					
LCS 160-266064/2-A	Lab Control Sample	100					
MB 160-266064/1-A	Method Blank	94					

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	DCB1					
		(23-146)					
160-18571-C-1-S MSD	Matrix Spike Duplicate	154 S					
160-18613-1	YMTFA60 C	89					
160-18613-2	YMTFA61 C	90					
160-18613-3	YMTFA62 C	106					
160-18613-5	YMTFA59 C	84					
160-18613-6	YMTFA66 C	4 S					

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Tracer/Carrier Summary

Client: Alliant Corporation

Project/Site: ORNL Y-12 Outfall 200 Characterization

TestAmerica Job ID: 160-18613-1

Method: SR-03-RC - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr (C) (40-110)	
160-18613-1	YMTFA60 C	82.9	
160-18613-2	YMTFA61 C	87.2	
160-18613-3	YMTFA62 C	89.3	
160-18613-4	YMTFA54 C	79.8	
160-18613-5	YMTFA59 C	88.3	
160-18613-6	YMTFA66 C	88.3	
160-18613-6 DU	YMTFA66 C	88.7	
LCS 160-266028/2-A	Lab Control Sample	88.9	
MB 160-266028/1-A	Method Blank	91.6	

Tracer/Carrier Legend

Sr (C) = Sr Carrier

Method: ST-RC-0301 - Radium-226 (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		At-217 (30-110)	
160-18590-A-1-P DU	Duplicate	68.6	
160-18613-1	YMTFA60 C	60.7	
160-18613-2	YMTFA61 C	74.7	
160-18613-3	YMTFA62 C	67.5	
160-18613-4	YMTFA54 C	64.5	
160-18613-5	YMTFA59 C	66.9	
160-18613-6	YMTFA66 C	65.9	
LCS 160-268959/2-A	Lab Control Sample	69.9	
MB 160-268959/1-A	Method Blank	55.0	

Tracer/Carrier Legend

At-217 = At-217

Method: TC-02-RC - Technetium-99 (LSC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Tc-99m (30-110)	
160-18571-C-1-D DU	Duplicate	23.5	
160-18613-1	YMTFA60 C	92.8	
160-18613-2	YMTFA61 C	79.4	
160-18613-3	YMTFA62 C	64.5	
160-18613-4	YMTFA54 C	62.2	
160-18613-5	YMTFA59 C	51.3	
160-18613-6	YMTFA66 C	95.1	
LCS 160-265424/2-A	Lab Control Sample	102	
MB 160-265424/1-A	Method Blank	107	

Tracer/Carrier Legend

Tc-99m = Tc-99m

TestAmerica St. Louis

Analytical Data Package Prepared For

TESTAMERICA ST. LOUIS**Radiochemical Analysis By
TestAmerica Inc*****2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.*****Assigned Laboratory Code: TA-RL*****Data Package Contains 30 Pages*****Report No.: 69432****Results in this report relate only to the sample(s) analyzed.**

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
51965		YMTFA54 C(160-18613-4)	J6H180414-4	M84X31AE	9M84X310	6231045
		YMTFA54 C(160-18613-4)	J6H180414-4	M84X31AG	9M84X310	6231046
		YMTFA54 C(160-18613-4)	J6H180414-4	M84X31AC	9M84X310	6231047
		YMTFA54 C(160-18613-4)	J6H180414-4	M84X31AF	9M84X310	6231048
		YMTFA54 C(160-18613-4)	J6H180414-4	M84X31AD	9M84X310	6231050
		YMTFA54 C(160-18613-4)	J6H180414-4	M84X32AA	9M84X320	6243030
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AE	9M84X410	6231045
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AG	9M84X410	6231046
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AC	9M84X410	6231047
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AF	9M84X410	6231048
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AA	9M84X410	6231049
		YMTFA59 C(160-18613-5)	J6H180414-5	M84X41AD	9M84X410	6231050
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AE	9M84XV10	6231045
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AG	9M84XV10	6231046
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AC	9M84XV10	6231047
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AF	9M84XV10	6231048
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AA	9M84XV10	6231049
		YMTFA60 C(160-18613-1)	J6H180414-1	M84XV1AD	9M84XV10	6231050
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AE	9M84X010	6231045
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AG	9M84X010	6231046
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AC	9M84X010	6231047
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AF	9M84X010	6231048
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AA	9M84X010	6231049
		YMTFA61 C(160-18613-2)	J6H180414-2	M84X01AD	9M84X010	6231050
		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AE	9M84X110	6231045
		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AG	9M84X110	6231046

Report No.: 69432

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.	4
51965		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AC	9M84X110	6231047	5
		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AF	9M84X110	6231048	6
		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AA	9M84X110	6231049	7
		YMTFA62 C(160-18613-3)	J6H180414-3	M84X11AD	9M84X110	6231050	8
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AE	9M84X510	6231045	9
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AG	9M84X510	6231046	10
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AC	9M84X510	6231047	11
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AF	9M84X510	6231048	12
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AA	9M84X510	6231049	13
		YMTFA66 C(160-18613-6)	J6H180414-6	M84X51AD	9M84X510	6231050	14



Certificate of Analysis

September 30, 2016

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Attention: Erika Gish

Date Received in Lab	:	August 18, 2016
Sample Type	:	Six(6) Solid
SDG Number	:	51965
Job Number	:	160-18613-1
Project Number/Name	:	16005502/ORNL Y-12 Outfall 200 Characterization

CASE NARRATIVE

I. Introduction

On August 18, 2016, six solid samples were received at the TestAmerica Richland laboratory for radiochemical analysis. Upon receipt the samples were assigned to Lot Number J6H180414 with the laboratory ID number corresponding to the client ID as shown on the cover page.

II. Sample Receipt

The samples were received in good condition; no anomalies were noted upon check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analyses requested were:

Alpha Spectroscopy

Americium 241 by method RL-ALP-001
Neptunium-237 by method RL-ALP-013
Plutonium-238, -239/240 by method RL-ALP-002
Thorium-228,230,232 by method RL-ALP-001
Uranium 234, 235 and 238 by method RL-ALP-009

Liquid Scintillation Counting

Carbon-14 by method RL-LSC-008

IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

V. Comments

Alpha Spectroscopy

Americium 241 by method RL-ALP-003:

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

Neptunium-237 by method RL-ALP-013:

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

Plutonium-238, -239/240 by method RL-ALP-002:

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

Thorium-228,230,232 by method RL-ALP-001

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

Uranium 234, 235 and 238 by method RL-ALP-015:

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

Liquid Scintillation Counting

Carbon-14 by method RL-LSC-008:

The LCS, batch blank, sample duplicate and sample results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW and/or NELAC, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

 **Roger A. Stringer**

Digitally signed by Roger A. Stringer
DN: cn=Roger A. Stringer, o, ou
email=Roger.Stringer@testamericainc.com, c=US
Date: 2016.09.30 16:49:36 -07'00'

Roger A. Stringer
Project Manager

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Drinking Water Method Cross References

DRINKING WATER ASTM METHOD CROSS REFERENCES		
Referenced Method	Isotope(s)	TestAmerica Richland's SOP No.
EPA 901.1	Cs-134, I-131	RL-GAM-001
EPA 900.0	Alpha & Beta	RL-GPC-001
EPA 00-02	Gross Alpha (Coprecipitation)	RL-GPC-002
EPA 903.0	Total Alpha Radium (Ra-226)	RL-RA-002
EPA 903.1	Ra-226	RL-RA-001
EPA 904.0	Ra-228	RL-RA-001
EPA 905.0	Sr-89/90	RL-GPC-003
ASTM D5174	Uranium	RL-KPA-003
EPA 906.0	Tritium	RL-LSC-005

Results in this report relate only to the sample(s) analyzed.

Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, $R = \text{constants} * f(x,y,z,...)$. The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/\sqrt{n}), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or TestAmerica.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
CSU (#s) <i>u_c Combined Standard Uncert.</i>	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, <i>u_c the combined standard uncertainty</i> . The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC MDA MDL	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt(TPUs ² + TPUD ²)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUD is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 30-Sep-16

TestAmerica Inc TA-RL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 69432

SDG No: 51965

Batch	Client Id Work Order	Parameter	Result +/- CSU (2 s)		Qual	Units	Tracer Yield	MDL	CRDL	RER2		
6231045 L4SO												
YMTFA54 C(160-18613-4)												
M84X31AE	PLUTONIUM-238	-1.64E-03	+- 4.1E-02		U	PCI_G	78%	8.09E-02	1.00E+00			
	PLUTONIUM-239/240	-4.10E-03	+- 4.1E-02		U	PCI_G	78%	9.21E-02	1.00E+00			
YMTFA59 C(160-18613-5)												
M84X41AE	PLUTONIUM-238	-5.63E-03	+- 2.4E-02		U	PCI_G	82%	6.23E-02	1.00E+00			
	PLUTONIUM-239/240	8.41E-03	+- 2.4E-02		U	PCI_G	82%	5.58E-02	1.00E+00			
YMTFA60 C(160-18613-1)												
M84XV1AE	PLUTONIUM-238	4.58E-02	+- 5.7E-02		U	PCI_G	77%	7.36E-02	1.00E+00			
	PLUTONIUM-239/240	1.44E-02	+- 3.3E-02		U	PCI_G	77%	6.80E-02	1.00E+00			
YMTFA60 C(160-18613-1) DUP												
M84XV1AH	PLUTONIUM-238	1.02E-02	+- 2.7E-02		U	PCI_G	82%	6.25E-02	1.00E+00	1.1		
	PLUTONIUM-239/240	-1.61E-03	+- 2.7E-02		U	PCI_G	82%	5.59E-02	1.00E+00	0.8		
YMTFA61 C(160-18613-2)												
M84X01AE	PLUTONIUM-238	1.04E-02	+- 2.9E-02		U	PCI_G	80%	6.89E-02	1.00E+00			
	PLUTONIUM-239/240	-1.73E-03	+- 2.9E-02		U	PCI_G	80%	6.00E-02	1.00E+00			
YMTFA62 C(160-18613-3)												
M84X11AE	PLUTONIUM-238	-3.82E-03	+- 3.2E-02		U	PCI_G	76%	7.39E-02	1.00E+00			
	PLUTONIUM-239/240	-1.91E-03	+- 3.2E-02		U	PCI_G	76%	6.62E-02	1.00E+00			
YMTFA66 C(160-18613-6)												
M84X51AE	PLUTONIUM-238	2.26E-02	+- 3.5E-02		U	PCI_G	82%	5.35E-02	1.00E+00			
	PLUTONIUM-239/240	6.88E-03	+- 2.5E-02		U	PCI_G	82%	6.43E-02	1.00E+00			
6231046 C0SR												
YMTFA54 C(160-18613-4)												
M84X31AG	URANIUM-233/234	1.36E-01	+- 9.0E-02			PCI_G	81%	5.41E-02	1.00E+00			
	URANIUM-235/236	-1.65E-03	+- 2.7E-02		U	PCI_G	81%	5.70E-02	1.00E+00			
	URANIUM-238	1.63E-01	+- 9.9E-02			PCI_G	81%	5.70E-02	1.00E+00			
YMTFA59 C(160-18613-5)												
M84X41AG	URANIUM-233/234	1.01E+00	+- 2.6E-01			PCI_G	89%	3.49E-02	1.00E+00			
	URANIUM-235/236	1.90E-02	+- 2.7E-02		U	PCI_G	89%	3.49E-02	1.00E+00			
	URANIUM-238	1.80E-01	+- 8.9E-02			PCI_G	89%	3.76E-02	1.00E+00			
YMTFA60 C(160-18613-1)												
M84XV1AG	URANIUM-233/234	1.90E-01	+- 9.4E-02			PCI_G	99%	4.37E-02	1.00E+00			
	URANIUM-235/236	-8.07E-04	+- 2.0E-02		U	PCI_G	99%	3.98E-02	1.00E+00			
	URANIUM-238	1.58E-01	+- 8.5E-02			PCI_G	99%	5.05E-02	1.00E+00			
YMTFA60 C(160-18613-1) DUP												
M84XV1AJ	URANIUM-233/234	2.08E-01	+- 1.1E-01			PCI_G	92%	4.85E-02	1.00E+00	0.3		
	URANIUM-235/236	0.00E+00	+- 2.5E-02		U	PCI_G	92%	4.51E-02	1.00E+00	0.1		
	URANIUM-238	2.55E-01	+- 1.2E-01			PCI_G	92%	5.70E-02	1.00E+00	1.3		

TestAmerica Inc RER2 - Replicate Error Ratio = $(S-D)/[\sqrt{(sq(TPUs)+sq(TPUs))}]$ as defined by ICPT BOA.
 rptTALRchSaSum U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan
 mary2 V5.7 A2002 software.

Sample Results Summary

Date: 30-Sep-16

TestAmerica Inc TA-RL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 69432

SDG No: 51965

Batch	Client Id Work Order	Parameter	Result +/- CSU (2 s)		Qual	Units	Tracer Yield	MDL	CRDL	RER2
6231046 C0SR										
		YMTFA61 C(160-18613-2)								
	M84X01AG	URANIUM-233/234	2.82E-01	+- 1.4E-01		PCI_G	89%	9.42E-02	1.00E+00	
		URANIUM-235/236	-8.32E-03	+- 3.0E-02	U	PCI_G	89%	8.17E-02	1.00E+00	
		URANIUM-238	1.23E-01	+- 9.2E-02		PCI_G	89%	8.55E-02	1.00E+00	
		YMTFA62 C(160-18613-3)								
	M84X11AG	URANIUM-233/234	2.23E-01	+- 1.1E-01		PCI_G	102%	6.18E-02	1.00E+00	
		URANIUM-235/236	0.00E+00	+- 2.5E-02	U	PCI_G	102%	4.63E-02	1.00E+00	
		URANIUM-238	1.85E-01	+- 1.0E-01		PCI_G	102%	6.18E-02	1.00E+00	
		YMTFA66 C(160-18613-6)								
	M84X51AG	URANIUM-233/234	1.61E-01	+- 9.9E-02		PCI_G	82%	6.54E-02	1.00E+00	
		URANIUM-235/236	2.69E-02	+- 3.9E-02	U	PCI_G	82%	5.03E-02	1.00E+00	
		URANIUM-238	1.77E-01	+- 1.0E-01		PCI_G	82%	5.41E-02	1.00E+00	
6231047 L4SX										
		YMTFA54 C(160-18613-4)								
	M84X31AC	AMERICIUM-241	-6.22E-03	+- 3.1E-02	U	PCI_G	88%	7.97E-02	1.00E+00	
		YMTFA59 C(160-18613-5)								
	M84X41AC	AMERICIUM-241	4.01E-02	+- 4.6E-02	U	PCI_G	88%	5.89E-02	1.00E+00	
		YMTFA60 C(160-18613-1)								
	M84XV1AC	AMERICIUM-241	7.23E-03	+- 3.0E-02	U	PCI_G	93%	8.17E-02	1.00E+00	
		YMTFA60 C(160-18613-1) DUP								
	M84XV1AK	AMERICIUM-241	4.24E-03	+- 2.7E-02	U	PCI_G	86%	7.63E-02	1.00E+00	0.1
		YMTFA61 C(160-18613-2)								
	M84X01AC	AMERICIUM-241	4.17E-02	+- 5.4E-02	U	PCI_G	74%	7.33E-02	1.00E+00	
		YMTFA62 C(160-18613-3)								
	M84X11AC	AMERICIUM-241	1.91E-02	+- 3.5E-02	U	PCI_G	87%	6.38E-02	1.00E+00	
		YMTFA66 C(160-18613-6)								
	M84X51AC	AMERICIUM-241	4.92E-02	+- 5.3E-02	U	PCI_G	75%	5.83E-02	1.00E+00	
6231048 L4S1										
		YMTFA54 C(160-18613-4)								
	M84X31AF	THORIUM-228	2.53E-01	+- 1.3E-01		PCI_G	91%	5.29E-02	1.00E+00	
		THORIUM-230	1.15E-01	+- 8.0E-02		PCI_G	91%	4.72E-02	1.00E+00	
		THORIUM-232	1.41E-01	+- 8.9E-02		PCI_G	91%	4.72E-02	1.00E+00	
		YMTFA59 C(160-18613-5)								
	M84X41AF	THORIUM-228	1.75E-01	+- 1.0E-01		PCI_G	95%	5.70E-02	1.00E+00	
		THORIUM-230	1.52E-01	+- 9.2E-02		PCI_G	95%	6.48E-02	1.00E+00	
		THORIUM-232	2.19E-01	+- 1.1E-01		PCI_G	95%	4.47E-02	1.00E+00	
		YMTFA60 C(160-18613-1)								
	M84XV1AF	THORIUM-228	1.03E-01	+- 7.6E-02		PCI_G	91%	5.69E-02	1.00E+00	

TestAmerica Inc RER2 - Replicate Error Ratio = $(S-D)/[\sqrt{(sq(TPUs)+sq(TPUs))}]$ as defined by ICPT BOA.
 rptTALRchSaSum U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan
 mary2 V5.7 A2002 software.

Sample Results Summary

Date: 30-Sep-16

TestAmerica Inc TA-RL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 69432

SDG No: 51965

Batch	Client Id Work Order	Parameter	Result +/- CSU (2 s)		Qual	Units	Tracer Yield	MDL	CRDL	RER2
6231048 L4S1										
		YMTFA60 C(160-18613-1)								
	M84XV1AF	THORIUM-230	1.49E-01	+- 9.1E-02		PCI_G	91%	5.24E-02	1.00E+00	
		THORIUM-232	1.26E-01	+- 8.3E-02		PCI_G	91%	4.62E-02	1.00E+00	
		YMTFA60 C(160-18613-1) DUP								
	M84XV1AL	THORIUM-228	3.06E-01	+- 1.4E-01		PCI_G	90%	5.12E-02	1.00E+00	2.5
		THORIUM-230	1.87E-01	+- 1.1E-01		PCI_G	90%	4.92E-02	1.00E+00	0.5
		THORIUM-232	2.67E-01	+- 1.3E-01		PCI_G	90%	4.92E-02	1.00E+00	1.8
		YMTFA61 C(160-18613-2)								
	M84X01AF	THORIUM-228	2.85E-01	+- 1.3E-01		PCI_G	89%	4.99E-02	1.00E+00	
		THORIUM-230	2.53E-01	+- 1.2E-01		PCI_G	89%	4.36E-02	1.00E+00	
		THORIUM-232	2.87E-01	+- 1.2E-01		PCI_G	89%	4.05E-02	1.00E+00	
		YMTFA62 C(160-18613-3)								
	M84X11AF	THORIUM-228	3.75E-01	+- 1.5E-01		PCI_G	85%	4.37E-02	1.00E+00	
		THORIUM-230	1.68E-01	+- 9.3E-02		PCI_G	85%	4.61E-02	1.00E+00	
		THORIUM-232	2.97E-01	+- 1.3E-01		PCI_G	85%	3.90E-02	1.00E+00	
		YMTFA66 C(160-18613-6)								
	M84X51AF	THORIUM-228	1.75E-01	+- 1.1E-01		PCI_G	81%	6.71E-02	1.00E+00	
		THORIUM-230	6.07E-02	+- 6.3E-02	U	PCI_G	81%	6.11E-02	1.00E+00	
		THORIUM-232	1.70E-01	+- 1.1E-01		PCI_G	81%	5.68E-02	1.00E+00	
6231050 E7XW										
		YMTFA54 C(160-18613-4)								
	M84X31AD	NEPTUNIUM-237	-2.73E-03	+- 1.4E-02		U	PCI_G	77%	3.52E-02	1.00E+00
		YMTFA59 C(160-18613-5)								
	M84X41AD	NEPTUNIUM-237	-4.80E-04	+- 1.2E-02		U	PCI_G	81%	2.38E-02	1.00E+00
		YMTFA60 C(160-18613-1)								
	M84XV1AD	NEPTUNIUM-237	-1.08E-03	+- 1.4E-02		U	PCI_G	85%	2.94E-02	1.00E+00
		YMTFA60 C(160-18613-1) DUP								
	M84XV1AN	NEPTUNIUM-237	-1.23E-03	+- 1.5E-02		U	PCI_G	91%	3.36E-02	1.00E+00
		YMTFA61 C(160-18613-2)								
	M84X01AD	NEPTUNIUM-237	-1.33E-03	+- 1.7E-02		U	PCI_G	73%	3.62E-02	1.00E+00
		YMTFA62 C(160-18613-3)								
	M84X11AD	NEPTUNIUM-237	4.53E-03	+- 1.2E-02		U	PCI_G	86%	2.79E-02	1.00E+00
		YMTFA66 C(160-18613-6)								
	M84X51AD	NEPTUNIUM-237	0.00E+00	+- 1.4E-02		U	PCI_G	84%	2.78E-02	1.00E+00
6231049 RL-LSC-008										
		YMTFA59 C(160-18613-5)								
	M84X41AA	CARBON-14	4.94E-02	+- 9.9E-02		U	PCI_G	100%	1.92E-01	1.00E+01
		YMTFA60 C(160-18613-1)								

TestAmerica Inc RER2 - Replicate Error Ratio = $(S-D)/[\sqrt{(sq(TPUs)+sq(TPUs))}]$ as defined by ICPT BOA.
 rptTALRchSaSum U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan
 mary2 V5.7 A2002 software.

Sample Results Summary

Date: 30-Sep-16

TestAmerica Inc TA-RL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 69432

SDG No: 51965

Batch	Client Id Work Order	Parameter	Result +- CSU (2 s)		Qual	Units	Tracer Yield	MDL	CRDL	RER2
6231049 RL-LSC-008										
	YMTFA60 C(160-18613-1) M84XV1AA CARBON-14		4.73E-02	+- 9.7E-02	U	PCI_G	100%	1.88E-01	1.00E+01	
	YMTFA60 C(160-18613-1) DUP M84XV1AM CARBON-14		3.99E-02	+- 9.7E-02	U	PCI_G	100%	1.88E-01	1.00E+01	0.1
	YMTFA61 C(160-18613-2) M84X01AA CARBON-14		-6.74E-03	+- 9.5E-02	U	PCI_G	100%	1.88E-01	1.00E+01	
	YMTFA62 C(160-18613-3) M84X11AA CARBON-14		9.23E-04	+- 9.6E-02	U	PCI_G	100%	1.88E-01	1.00E+01	
	YMTFA66 C(160-18613-6) M84X51AA CARBON-14		-4.42E-02	+- 9.6E-02	U	PCI_G	100%	1.92E-01	1.00E+01	
6243030 RL-LSC-008										
	YMTFA54 C(160-18613-4) M84X32AA CARBON-14		-1.88E-02	+- 1.0E-01	U	PCI_G	100%	1.82E-01	1.00E+01	
No. of Results: 77										

QC Results Summary

Date: 30-Sep-16

TestAmerica Inc TA-RL

Ordered by Method, Batch No, QC Type,.

Report No. : 69432

SDG No.: 51965

Batch	Work Order	Parameter	Result +- CSU (2 s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
L4SO									
6231045	BLANK QC,								
M841W1AA	PLUTONIUM-238		-1.37E-03 +- 3.4E-02	U	PCI_G	90%			6.73E-02
	PLUTONIUM-239/240		1.36E-02 +- 3.4E-02	U	PCI_G	90%			7.67E-02
6231045	LCS,								
M841W1AC	PLUTONIUM-239/240		3.47E+00 +- 8.5E-01		PCI_G	74%	93%	-0.1	8.58E-02
C0SR									
6231046	BLANK QC,								
M841X1AA	URANIUM-233/234		-2.17E-03 +- 2.7E-02	U	PCI_G	81%			5.89E-02
	URANIUM-235/236		-2.17E-03 +- 2.7E-02	U	PCI_G	81%			5.89E-02
	URANIUM-238		-1.63E-03 +- 2.7E-02	U	PCI_G	81%			5.65E-02
6231046	LCS,								
M841X1AC	URANIUM-233/234		2.72E+00 +- 5.9E-01		PCI_G	85%	105%	0.0	8.53E-02
	URANIUM-238		3.23E+00 +- 6.8E-01		PCI_G	85%	118%	0.2	9.47E-02
L4SX									
6231047	BLANK QC,								
M84101AA	AMERICIUM-241		1.31E-02 +- 3.3E-02	U	PCI_G	81%			7.37E-02
6231047	LCS,								
M84101AC	AMERICIUM-241		3.57E+00 +- 7.8E-01		PCI_G	98%	87%	-0.1	6.55E-02
L4S1									
6231048	BLANK QC,								
M84111AA	THORIUM-228		2.57E-02 +- 3.9E-02	U	PCI_G	86%			5.70E-02
	THORIUM-230		-5.26E-04 +- 2.6E-02	U	PCI_G	86%			4.82E-02
	THORIUM-232		0.00E+00 +- 2.6E-02	U	PCI_G	86%			4.82E-02
6231048	LCS,								
M84111AC	THORIUM-230		2.38E+00 +- 5.7E-01		PCI_G	96%	115%	0.2	5.55E-02
E7XW									
6231050	BLANK QC,								
M84131AA	NEPTUNIUM-237		-7.68E-04 +- 1.9E-02	U	PCI_G	77%			3.81E-02
6231050	LCS,								
M84131AC	NEPTUNIUM-237		1.38E+00 +- 4.2E-01		PCI_G	77%	87%	-0.1	3.02E-02
RL-LSC-008									
6231049	BLANK QC,								
M84121AA	CARBON-14		-8.37E-02 +- 9.4E-02	U	PCI_G	100%			1.89E-01
6231049	LCS,								
M84121AC	CARBON-14		6.96E+00 +- 5.0E-01		PCI_G	100%	98%	0.0	1.88E-01
No. of Results: 18									

TestAmerica Inc Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchQcSum U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.
mary V5.7 A2002

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-4
Client Sample ID: YMTFA54 C(160-18613-4)

SDG: 51965

Report No.: 69432

COC No. :

Collection Date: 8/11/2016 1:35:00 PM
Received Date: 8/18/2016 10:00:00 AM

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045 L4SO												
PLUTONIUM-238	-1.84E-03	U		Work Order: M84X31AE 4.1E-02	8.09E-02	PCL_G	78%	-0.02	9/29/16 05:48 p		1.04	ALP40
PLUTONIUM-239/240	-4.10E-03	U		4.1E-02	9.21E-02	PCL_G	78%	-0.04	9/29/16 05:48 p		1.04	ALP40
URANIUM-233/234	1.36E-01			Work Order: M84X31AG 9.0E-02	5.41E-02	PCL_G	81% (2.5) (3.)		9/20/16 08:49 p		1.14	ALP218
URANIUM-235/236	-1.65E-03	U		2.7E-02	5.70E-02	PCL_G	81% 1.29E-02	1.00E+00 -0.12	9/20/16 08:49 p		1.14	ALP218
URANIUM-238	1.63E-01			9.9E-02	5.70E-02	PCL_G	81% (2.9) 1.29E-02	1.00E+00 (3.3)	9/20/16 08:49 p		1.14	ALP218
Batch: 6231046 C0SR												
URANIUM-233/234	1.36E-01			Work Order: M84X31AC 9.0E-02	5.41E-02	PCL_G	81% 1.15E-02	1.00E+00 (3.)	9/20/16 08:49 p		1.14	ALP218
URANIUM-235/236	-1.65E-03	U		2.7E-02	5.70E-02	PCL_G	81% 1.29E-02	1.00E+00 -0.12	9/20/16 08:49 p		1.14	ALP218
URANIUM-238	1.63E-01			9.9E-02	5.70E-02	PCL_G	81% (2.9) 1.29E-02	1.00E+00 (3.3)	9/20/16 08:49 p		1.14	ALP218
Batch: 6231047 L4SX												
AMERICIUM-241	-6.22E-03	U		Work Order: M84X31AF 3.1E-02	7.97E-02	PCL_G	88% 2.18E-02	1.00E+00 -0.4	9/27/16 04:36 p		1.04	ALP430
THORIUM-228	2.53E-01			Work Order: M84X31AF 1.3E-01	5.29E-02	PCL_G	91% (4.8) 1.12E-02	1.00E+00 (4.)	9/21/16 11:01 a		1.04	ALP116
THORIUM-230	1.15E-01			8.0E-02	4.72E-02	PCL_G	91% (2.4) 9.22E-03	1.00E+00 (2.9)	9/21/16 11:01 a		1.04	ALP116
Batch: 6231048 L4S1												
THORIUM-228				Work Order: M84X31AF 1.3E-01	5.29E-02	PCL_G	91% (4.8) 1.12E-02	1.00E+00 (4.)	9/21/16 11:01 a		1.04	ALP116
THORIUM-230				8.0E-02	4.72E-02	PCL_G	91% (2.4) 9.22E-03	1.00E+00 (2.9)	9/21/16 11:01 a		1.04	ALP116

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
 Lot-Sample No.: J6H180414-4
 Client Sample ID: YMTFA54 C(160-18613-4)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	1.41E-01			8.9E-02	4.72E-02	PCL_G	91%	(3.)	9/21/16 11:01 a		1.04	ALP116
					9.22E-03	1.00E+00		(3.2)			g	
Batch:	6231050	E7XW		Work Order:	M84X31AD		Report DB ID:	9M84X310				
NEPTUNIUM-237	-2.73E-03	U	1.4E-02	1.4E-02	3.52E-02	PCL_G	77%	-0.08	9/9/16 09:19 p		1.17	ALP115
					1.01E-02	1.00E+00		-0.39			g	
Batch:	6243030	RL-LSC-008		Work Order:	M84X32AA		Report DB ID:	9M84X320				
CARBON-14	1.88E-02	U	7.8E-02	1.0E-01	1.82E-01	PCL_G	100%	-0.1	8/30/16 10:57 p		5.2	LSC9
					8.82E-02	1.00E+01		-0.38			g	
No. of Results:	11	Comments:										

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-5
Client Sample ID: YMTFA59 C(160-18613-5)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045	L4SO			Work Order: M84X41AE	Report DB ID: 9M84X410							
PLUTONIUM-238	-5.63E-03	U	2.4E-02	6.23E-02	PCL_G	82%	-0.09	9/29/16 05:49 p		1.45	ALP41	
PLUTONIUM-239/240	8.41E-03	U	2.4E-02	5.58E-02	PCL_G	82%	-0.48	9/29/16 05:49 p		g	ALP41	
					1.44E-02	1.00E+00	0.71			1.45		
				Work Order: M84X41AG	Report DB ID: 9M84X410							
Batch: 6231046	C0SR			2.6E-01	3.49E-02	PCL_G	89%	(28.9)	9/20/16 06:06 p		1.56	ALP408
URANIUM-233/234	1.01E+00				6.82E-03	1.00E+00	(7.6)			g		
URANIUM-235/236	1.90E-02	U	2.7E-02	3.49E-02	PCL_G	89%	0.54	9/20/16 06:06 p		1.56	ALP408	
URANIUM-238	1.80E-01		8.9E-02	3.76E-02	PCL_G	89%	(1.4)	9/20/16 06:06 p		g	ALP408	
					7.99E-03	1.00E+00	(4.8)			1.56		
				Work Order: M84X41AC	Report DB ID: 9M84X410							
Batch: 6231047	L4SX			4.6E-02	5.89E-02	PCL_G	88%	0.68	9/27/16 04:37 p		1.45	ALP431
AMERICIUM-241	4.01E-02	U			1.64E-02	1.00E+00	(1.8)			g		
				Work Order: M84X41AF	Report DB ID: 9M84X410							
Batch: 6231048	L4S1			1.0E-01	5.70E-02	PCL_G	95%	(3.1)	9/21/16 11:01 a		1.45	ALP23
THORIUM-228	1.75E-01				1.39E-02	1.00E+00	(3.5)			g		
THORIUM-230	1.52E-01		9.2E-02	6.48E-02	PCL_G	95%	(2.4)	9/21/16 11:01 a		1.45	ALP23	
					1.83E-02	1.00E+00	(3.3)			g		

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-5
Client Sample ID: YMTFA59 C(160-18613-5)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	2.19E-01			1.1E-01	4.47E-02	PCL_G	95%	(4.9)	9/21/16 11:01 a			ALP23
					8.72E-03	1.00E+00	(4.)					g
Batch: 6231049 CARBON-14	RL-LSC-008 4.94E-02	U	8.2E-02	9.9E-02	1.92E-01	PCL_G	100%	0.26	8/27/16 06:02 p			LSC3
					9.34E-02	1.00E+01	(1.)					g
Batch: 6231050 NEPTUNIUM-237	E7XW 4.80E-04	U	1.2E-02	1.2E-02	2.38E-02	PCL_G	81%	-0.02	9/9/16 09:20 p			ALP116
					5.60E-03	1.00E+00	-0.08					g
No. of Results:	11	Comments:										

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-1
Client Sample ID: YMTFA60 C(160-18613-1)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045	L4SO			Work Order: M84XV1AE 5.7E-02	7.36E-02	PCL_G	77%	0.62 (1.6)	9/29/16 05:44 p		1.09	ALP432
PLUTONIUM-238	4.58E-02	U			1.80E-02	1.00E+00					g	
PLUTONIUM-239/240	1.44E-02	U		3.3E-02	6.80E-02	PCL_G	77%	0.21	9/29/16 05:44 p		1.09	ALP432
					1.53E-02	1.00E+00		0.88			g	
Batch: 6231046	C0SR			Work Order: M84XV1AG 9.4E-02	4.37E-02	PCL_G	99%	(4.3) (4.)	Report DB ID: 9M84XX/10 9/20/16 06:00 p		1.3	ALP211
URANIUM-233/234	1.90E-01				1.03E-02	1.00E+00					g	
URANIUM-235/236	-8.07E-04	U		2.0E-02	3.98E-02	PCL_G	99%	-0.02	Report DB ID: 9M84XX/10 9/20/16 06:00 p		1.3	ALP211
URANIUM-238	1.58E-01				8.46E-03	1.00E+00		-0.08			g	
				8.5E-02	5.05E-02	PCL_G	99%	(3.1) (3.7)	9/20/16 06:00 p		1.3	ALP211
					1.36E-02	1.00E+00					g	
Batch: 6231047	L4SX			Work Order: M84XV1AC 3.0E-02	8.17E-02	PCL_G	93%	0.09	Ratio U-234/U-238 = 1.2 Report DB ID: 9M84XX/10 9/27/16 04:33 p		1.09	ALP425
AMERICIUM-241	7.23E-03	U			2.33E-02	1.00E+00		0.47			g	
Batch: 6231048	L4S1			Work Order: M84XV1AF 7.6E-02	5.69E-02	PCL_G	91%	(1.8) (2.7)	Report DB ID: 9M84XX/10 9/21/16 10:59 a		1.09	ALP111
THORIUM-228	1.03E-01				1.34E-02	1.00E+00					g	
THORIUM-230	1.49E-01			9.1E-02	5.24E-02	PCL_G	91%	(2.9) (3.3)	Report DB ID: 9M84XX/10 9/21/16 10:59 a		1.09	ALP111
					1.18E-02	1.00E+00					g	

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-1
Client Sample ID: YMTFA60 C(160-18613-1)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	1.26E-01			8.3E-02	4.62E-02	PCL_G	91%	(2.7)	9/21/16 10:59 a		1.09	ALP111
							9.02E-03	1.00E+00	(3.)		g	
Batch: 6231049 CARBON-14	RL-LSC-008 4.73E-02	U	8.0E-02	9.7E-02	1.88E-01	PCL_G	100%	0.25	8/27/16 07:39 a		5.1	LSC3
							9.16E-02	1.00E+01	0.98		g	
Batch: 6231050 NEPTUNIUM-237	E7XW 1.08E-03	U	1.4E-02	1.4E-02	2.94E-02	PCL_G	85%	-0.04	9/9/16 09:17 p		1.09	ALP111
							7.48E-03	1.00E+00	-0.16		g	
No. of Results:	11	Comments:										

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-2
Client Sample ID: YMTFA61 C(160-18613-2)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncrt	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045 L4SO												
PLUTONIUM-238	1.04E-02	U		Work Order: M84X01AE	Report DB ID: 9M84X010							
				2.9E-02	6.89E-02	PCL_G	80%	0.15	9/29/16 05:46 p			1.25 ALP436
PLUTONIUM-239/240	-1.73E-03	U			1.78E-02	1.00E+00	0.71					g
				2.9E-02	6.00E-02	PCL_G	80%	-0.03	9/29/16 05:46 p			1.25 ALP436
					1.35E-02	1.00E+00	-0.12					g
Batch: 6231046 C0SR												
URANIUM-233/234	2.82E-01			Work Order: M84X01AG	Report DB ID: 9M84X010							
				1.4E-01	9.42E-02	PCL_G	89%	(3.)	9/20/16 06:03 p			0.98 ALP215
URANIUM-235/236	-8.32E-03	U			2.98E-02	1.00E+00	(4.)					g
				3.0E-02	8.17E-02	PCL_G	89%	-0.1	9/20/16 06:03 p			0.98 ALP215
URANIUM-238	1.23E-01				2.36E-02	1.00E+00	-0.55					g
				9.2E-02	8.55E-02	PCL_G	89%	(1.4)	9/20/16 06:03 p			0.98 ALP215
					2.55E-02	1.00E+00	(2.7)					g
Batch: 6231047 L4SX												
AMERICIUM-241	4.17E-02	U		Work Order: M84X01AC	Report DB ID: 9M84X010							
				5.4E-02	7.33E-02	PCL_G	74%	0.57	9/27/16 04:34 p			1.25 ALP427
					1.89E-02	1.00E+00	(1.6)					g
Batch: 6231048 L4S1												
THORIUM-228	2.85E-01			Work Order: M84X01AF	Report DB ID: 9M84X010							
				1.3E-01	4.99E-02	PCL_G	89%	(5.7)	9/21/16 11:00 a			1.25 ALP115
THORIUM-230	2.53E-01				1.18E-02	1.00E+00	(4.5)					g
				1.2E-01	4.36E-02	PCL_G	89%	(5.8)	9/21/16 11:00 a			1.25 ALP115
					9.26E-03	1.00E+00	(4.4)					g

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
 Lot-Sample No.: J6H180414-2
 Client Sample ID: YMTFA61 C(160-18613-2)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	2.87E-01			1.2E-01	4.05E-02	PCL_G	89%	(7.1)	9/21/16 11:00 a		1.25	ALP115
						7.91E-03	1.00E+00	(4.6)			g	
Batch: 6231049	RL-LSC-008			Work Order: M84X01AA		Report DB ID: 9M84X010						
CARBON-14	-6.74E-03	U	7.9E-02	9.5E-02	1.88E-01	PCL_G	100%	-0.04	8/27/16 11:48 a		5.1	LSC3
						9.14E-02	1.00E+01	-0.14			g	
Batch: 6231050	E7XW			Work Order: M84X01AD		Report DB ID: 9M84X010						
NEPTUNIUM-237	1.33E-03	U	1.7E-02	1.7E-02	3.62E-02	PCL_G	73%	-0.04	9/9/16 09:18 p		1.26	ALP113
						9.21E-03	1.00E+00	-0.16			g	
No. of Results:	11	Comments:										

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-3
Client Sample ID: YMTFA62 C(160-18613-3)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045 PLUTONIUM-238	L4SO -3.82E-03	U		Work Order: M84X11AE 3.2E-02	PCL_G 7.39E-02	Report DB ID: 9M84X110 1.86E-02	76% 1.00E+00	-0.05 -0.24	9/29/16 05:48 p			1.36 ALP39
PLUTONIUM-239/240	-1.91E-03	U		3.2E-02	PCL_G 6.62E-02	76% 1.49E-02	-0.03 -0.12	9/29/16 05:48 p			1.36 ALP39	
Batch: 6231046 URANIUM-233/234	C0SR 2.23E-01			Work Order: M84X11AG 1.1E-01	PCL_G 6.18E-02	Report DB ID: 9M84X110 1.63E-02	102% 1.00E+00	(3.6) (3.9)	9/20/16 06:04 p			1.05 ALP217
URANIUM-235/236	0.00E+00	U		2.5E-02	PCL_G 4.63E-02	102% 9.05E-03	0. 1.00E+00	0. 0.	9/20/16 06:04 p			1.05 ALP217
URANIUM-238	1.85E-01			1.0E-01	PCL_G 6.18E-02	102% 1.63E-02	0. 1.00E+00	(3.) (3.6)	9/20/16 06:04 p			1.05 ALP217
Batch: 6231047 AMERICIUM-241	L4SX 1.91E-02	U		Work Order: M84X11AC 3.5E-02	PCL_G 6.38E-02	Report DB ID: 9M84X110 1.77E-02	100E+00	(1.1)	Ratio U-234/U-238 = 1.2			1.36 ALP429
THORIUM-228	3.75E-01			1.5E-01	PCL_G 4.37E-02	Report DB ID: 9M84X110 9.29E-03	85% 1.00E+00	(8.6) (4.9)	9/21/16 11:00 a			1.36 ALP114
THORIUM-230	1.68E-01			9.3E-02	PCL_G 4.61E-02	85% 1.09E-02	0. 1.00E+00	(3.6) (3.6)	9/21/16 11:00 a			1.36 ALP114
Batch: 6231048 THORIUM-228	L4S1			Work Order: M84X11AF 1.5E-01	PCL_G 9.29E-03	Report DB ID: 9M84X110 9.29E-03	87% 1.00E+00	(8.6) (4.9)	9/21/16 11:00 a			1.36 g
THORIUM-230	1.68E-01			9.3E-02	PCL_G 4.61E-02	85% 1.09E-02	0. 1.00E+00	(3.6) (3.6)	9/21/16 11:00 a			1.36 g

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
 Lot-Sample No.: J6H180414-3
 Client Sample ID: YMTFA62 C(160-18613-3)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	2.97E-01		1.3E-01	3.90E-02	PCL_G	85%	(7.6)	9/21/16 11:00 a		1.36	g	ALP114
				7.61E-03	1.00E+00	(4.6)						
Batch: 6231049 CARBON-14	RL-LSC-008 9.23E-04	U	7.9E-02	9.6E-02	Work Order: M84X11AA 1.88E-01	PCL_G	100%	0.	Report DB ID: 9M84X110 8/27/16 01:53 p	5.1	g	LSC3
					9.15E-02	1.00E+01	0.02					
Batch: 6231050 NEPTUNIUM-237	E7XW 4.53E-03	U	1.2E-02	1.2E-02	Work Order: M84X11AD 2.79E-02	PCL_G	86%	0.16	Report DB ID: 9M84X110 9/9/16 09:18 p	1.21	g	ALP114
					7.48E-03	1.00E+00	0.75					
No. of Results:	11	Comments:										

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-6
Client Sample ID: YMTFA66 C(160-18613-6)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector	
Batch: 6231045 L4SO													
PLUTONIUM-238	2.26E-02	U		Work Order: M84X51AE 3.5E-02	5.35E-02	PCL_G	82%	0.42 (1.3)	9/29/16 05:49 p		1.4	ALP43	
PLUTONIUM-239/240	6.88E-03	U		2.5E-02	6.43E-02	PCL_G	82%	0.11 0.55	9/29/16 05:49 p		1.4	ALP43	
URANIUM-233/234	1.61E-01			Work Order: M84X51AG 9.9E-02	6.54E-02	PCL_G	82% (2.5)		Report DB ID: 9M84X510 9/20/16 06:07 p		1.15	ALP411	
URANIUM-235/236	2.69E-02	U		3.9E-02	5.03E-02	PCL_G	82% 9.82E-03	1.00E+00 (1.4)	Report DB ID: 9M84X510 9/20/16 06:07 p		g	1.15	ALP411
URANIUM-238	1.77E-01			1.0E-01	5.41E-02	PCL_G	82% 1.15E-02	1.00E+00 (3.4)	Report DB ID: 9M84X510 9/20/16 06:07 p		g	1.15	ALP411
Batch: 6231046 C0SR													
URANIUM-233/234	1.61E-01			Work Order: M84X51AC 9.9E-02	6.54E-02	PCL_G	82% 1.69E-02	1.00E+00 (3.2)	Report DB ID: 9M84X510 9/20/16 06:07 p		g	1.15	ALP411
URANIUM-235/236	2.69E-02	U		3.9E-02	5.03E-02	PCL_G	82% 9.82E-03	1.00E+00 (1.4)	Report DB ID: 9M84X510 9/20/16 06:07 p		g	1.15	ALP411
AMERICIUM-241	4.92E-02	U		5.3E-02	5.83E-02	PCL_G	75% 1.42E-02	1.00E+00 (1.9)	Report DB ID: 9M84X510 9/27/16 04:38 p		g	1.4	ALP432
THORIUM-228	1.75E-01			Work Order: M84X51AF 1.1E-01	6.71E-02	PCL_G	81% 1.51E-02	1.00E+00 (3.1)	Report DB ID: 9M84X510 9/21/16 11:01 a		1.4	ALP24	
THORIUM-230	6.07E-02	U		6.3E-02	6.11E-02	PCL_G	81% 1.30E-02	1.00E+00 (1.9)	Report DB ID: 9M84X510 9/21/16 11:01 a		g	1.4	ALP24
Batch: 6231048 L4S1													
THORIUM-228	1.75E-01			Work Order: M84X51AF 1.1E-01	6.71E-02	PCL_G	81% 1.51E-02	1.00E+00 (3.1)	Report DB ID: 9M84X510 9/21/16 11:01 a		1.4	ALP24	
THORIUM-230	6.07E-02	U		6.3E-02	6.11E-02	PCL_G	81% 1.30E-02	1.00E+00 (1.9)	Report DB ID: 9M84X510 9/21/16 11:01 a		g	1.4	ALP24

FORM I
SAMPLE RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
 Lot-Sample No.: J6H180414-6
 Client Sample ID: YMTFA66 C(160-18613-6)

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-232	1.70E-01		1.1E-01	5.68E-02	PCL_G	81% 1.11E-02	1.00E+00	(3.) (3.2)	9/21/16 11:01 a		1.4 g	ALP24
Batch: 6231049 CARBON-14	RL-LSC-008 -4.42E-02	U	8.0E-02	9.6E-02	Work Order: M84X51AA 1.92E-01	PCL_G	Report DB ID: 9M84X510 100%	-0.23 -0.92	8/27/16 08:06 p		5.0 g	LSC3
Batch: 6231050 NEPTUNIUM-237	E7XW 0.00E+00	U	0.0E+00	1.4E-02	Work Order: M84X51AD 2.78E-02	PCL_G	Report DB ID: 9M84X510 84%	0. 0.	9/9/16 09:20 p		1.04 g	ALP117
No. of Results:	11	Comments:										

FORM II

Date: 30-Sep-16

DUPLICATE RESULTS

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-1
Client Sample ID: YMTFA60 C(160-18613-1) DUP

SDG: 51965
Report No. : 69432
COC No. :

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, CRDL	Rst/MDL, Rst/TotUncrt	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6231045	L4SO			Work Order: M84XV1AH		Report DB ID: M84XV1HR		Orig Sa DB ID: 9M84XV10			
PLUTONIUM-238	1.02E-02	U	2.7E-02	6.25E-02	PCI_G	82%	0.16	9/29/16 05:45 p		1.32	ALP433
	4.58E-02	U	RER2 1.1	1.00E+00			0.75			g	
PLUTONIUM-239/240	-1.61E-03	U	2.7E-02	5.59E-02	PCI_G	82%	-0.03	9/29/16 05:45 p		1.32	ALP433
	1.44E-02	U	RER2 0.8	1.00E+00			-0.12			g	
<i>Alpha Spec Result Sum = 8.6E-03</i>											
Page Batch: 6231046	C0SR			Work Order: M84XV1AJ		Report DB ID: M84XV1JR		Orig Sa DB ID: 9M84XV10			
URANIUM-233/234	2.08E-01		1.1E-01	4.85E-02	PCI_G	92%	(4.3)	9/20/16 06:01 p		1.17	ALP212
	1.90E-01		RER2 0.3	1.00E+00			(3.9)			g	
URANIUM-235/236	0.00E+00	U	2.5E-02	4.51E-02	PCI_G	92%	0.	9/20/16 06:01 p		1.17	ALP212
	-8.07E-04	U	RER2 0.1	1.00E+00			0.			g	
URANIUM-238	2.55E-01		1.2E-01	5.70E-02	PCI_G	92%	(4.5)	9/20/16 06:01 p		1.17	ALP212
	1.58E-01		RER2 1.3	1.00E+00			(4.2)			g	
<i>Ratio U-234/238 = 0.8</i>											
Batch: 6231047	L4SX			Work Order: M84XV1AK		Report DB ID: M84XV1KR		Orig Sa DB ID: 9M84XV10			
AMERICIUM-241	4.24E-03	U	2.7E-02	7.63E-02	PCI_G	86%	0.06	9/27/16 04:33 p		1.32	ALP426
	7.23E-03	U	RER2 0.1	1.00E+00			0.32			g	
<i>Alpha Spec Result Sum = 4.7E-01</i>											
Batch: 6231048	L4S1			Work Order: M84XV1AL		Report DB ID: M84XV1LR		Orig Sa DB ID: 9M84XV10			
THORIUM-228	3.06E-01		1.4E-01	5.12E-02	PCI_G	90%	(6.)	9/21/16 11:00 a		1.32	ALP112
	1.03E-01		RER2 2.5	1.00E+00			(4.3)			g	
<i>Alpha Spec Result Sum = 4.8E-01</i>											
TestAmerica Inc	RER2	-	Replicate Error Ratio = $(S-D)/[\sqrt{sq(TPUs)+sq(TPUs)}]$ as defined by ICPT BOA.								
10/3/2017 A2002	PrfSTLRchDUpV5	MDC/MDA,Lc	- Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.								
		U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.									

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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FORM II

Date: 30-Sep-16

DUPLICATE RESULTS

Lab Name: TestAmerica Inc
Lot-Sample No.: J6H180414-1
Client Sample ID: YMTFA60 C(160-18613-1) DUP

SDG: 51965
Report No. : 69432
COC No. :

Parameter	Result, Orig Rst	Count Qual	CSU (2 s)	Rpt Unit, MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUncrt	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
THORIUM-230	1.87E-01		1.1E-01	4.92E-02	PCI_G	90%	(3.8) (3.5)	9/21/16 11:00 a			1.32
	1.49E-01		RER2 0.5	1.00E+00							ALP112
THORIUM-232	2.67E-01		1.3E-01	4.92E-02	PCI_G	90%	(5.4) (4.1)	9/21/16 11:00 a			1.32
	1.26E-01		RER2 1.8	1.00E+00							ALP112
Alpha Spec Result Sum = 4.5E-01											
Batch: 6231049 CARBON-14	RL-LSC-008			Work Order: M84XV1AM	Report DB ID: M84XV1MR		Orig Sa DB ID: 9M84XV10				
	3.99E-02	U	8.0E-02	9.7E-02	PCI_G	100%	8/27/16 09:44 a				5.1
Batch: 4.73E-02		U		RER2 0.1	1.00E+01	0.83					g
Alpha Spec Result Sum = 4.5E-01											
Batch: 6231050 NEPTUNIUM-237	E7XW			Work Order: M84XV1AN	Report DB ID: M84XV1NR		Orig Sa DB ID: 9M84XV10				
	-1.23E-03	U	1.5E-02	1.5E-02	PCI_G	91%	-0.04 -0.16	9/9/16 09:17 p			1.13
Batch: -1.08E-03		U		RER2 0.0	1.00E+00						ALP112
											g
Alpha Spec Result Sum = 4.5E-01											

No. of Results: 11 Comments:

FORM II

BLANK RESULTS

Date: 30-Sep-16

Lab Name: TestAmerica Inc
Matrix: SOLID

SDG: 51966
Report No. : 69432

Parameter	Result	Count Error (2 s)	CSU (2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector	
Batch: 6231049	RL-LSC-008	9.4E-02	M84121AA	PCI_G	100%	-0.44	8/28/16 12:43 p		5.1	g	LSC3	
CARBON-14	-8.37E-02	U	7.8E-02	9.21E-02	1.00E+01		(-1.8)					
Batch: 6231046	C0SR	2.7E-02	M841X1AA	Report DB ID: M841X1AB								
URANIUM-233/234	-2.17E-03	U	5.89E-02	PCI_G	81%	-0.04	9/20/16 06:07 p		1.19	g	ALP412	
URANIUM-235/236	-2.17E-03	U	1.39E-02	1.00E+00		-0.16						
URANIUM-238	-1.63E-03	U	5.89E-02	PCI_G	81%	-0.04	9/20/16 06:07 p		1.19	g	ALP412	
		2.7E-02	1.39E-02	1.00E+00		-0.16						
		5.65E-02	5.65E-02	PCI_G	81%	-0.03	9/20/16 06:07 p		1.19	g	ALP412	
		1.27E-02	1.27E-02	1.00E+00		-0.12						
							Ratio U-234/U-238 = 1.3					
Batch: 6231050	E7XW	1.9E-02	M84131AA	Report DB ID: M84131AB								
NEPTUNIUM-237	-7.68E-04	U	3.81E-02	PCI_G	77%	-0.02	9/9/16 09:21 p		1.06	g	ALP119	
		8.97E-03	8.97E-03	1.00E+00		-0.08						
Batch: 6231048	L4S1	3.9E-02	M8411AA	Report DB ID: M8411AB								
THORIUM-228	2.57E-02	U	5.70E-02	PCI_G	86%	0.45	9/21/16 11:02 a		1.1	g	ALP25	
THORIUM-230	-5.26E-04	U	1.28E-02	1.00E+00		(1.3)						
THORIUM-232	0.00E+00	U	2.6E-02	4.82E-02	PCI_G	86%	-0.01	9/21/16 11:02 a		1.1	g	ALP25
		4.82E-02	9.42E-03	1.00E+00		-0.04						
		9.42E-03	9.42E-03	PCI_G	86%	0.	9/21/16 11:02 a		1.1	g	ALP25	
				1.00E+00		0.						
Batch: 6231045	L4SO	Work Order: M841W1AA	Report DB ID: M841W1AB									

FORM II**BLANK RESULTS**

Date: 30-Sep-16

Lab Name: TestAmerica Inc

Matrix: SOLID

SDG: 51965

Report No. : 69432

Parameter	Result	Count Error (2 s)	CSU (2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
PLUTONIUM-238	-1.37E-03	U	3.4E-02	6.73E-02	PCI_G	90%	-0.02	9/29/16 05:50 p	1.1	ALP44	
PLUTONIUM-239/240	1.36E-02	U	3.4E-02	1.43E-02	1.00E+00		-0.08		g		
				7.67E-02	PCI_G	90%	0.18	9/29/16 05:50 p	1.1	ALP44	
				1.87E-02	1.00E+00		0.79		g		
Batch: 6231047	L4SX			Work Order: M84101AA		Report DB ID: M84101AB					
AMERICIUM-241	1.31E-02	U	3.3E-02	7.37E-02	PCI_G	81%	0.18	9/27/16 04:38 p	1.1	ALP433	
				1.80E-02	1.00E+00		0.79		g		

No. of Results: 11 Comments:

FORM II

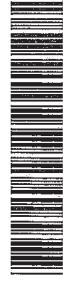
Date: 30-Sep-16

LCS RESULTS

Lab Name: TestAmerica Inc
Matrix: SOLID

SDG: 51966
Report No.: 69432

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL	Report Unit	Yield	Expected	Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 6231049 URANIUM-233/234	RL-LSC-008 2.72E+00	1.7E-01	5.0E-01	Work Order: M84121AC 5.9E-01	1.88E-01	PCI_G	Report DB ID: M84121CS 100%	7.08E+00	1.42E-01	98%	8/28/16 02:48 p	5.1	LSC3
CARBON-14	6.96E+00						Rec Limits:	75	125	0.0		g	
Batch: 6231046 URANIUM-233/234	C0SR 2.72E+00			Work Order: M841X1AC 5.9E-01	8.53E-02	PCI_G	Report DB ID: M841X1CS 85%	2.60E+00	1.37E-02	105%	9/20/16 06:08 p	1.27	ALP11
URANIUM-238	3.23E+00				6.8E-01	9.47E-02	PCI_G	Rec Limits:	75	125	0.0	g	
Page 59 of 61	Batch: 6231050 NEPTUNIUM-237	E7XW 1.38E+00	2.0E-01	4.2E-01	3.02E-02	PCI_G	Report DB ID: M84131AC 77%	1.59E+00	7.32E-02	87%	9/10/16 01:12 a	1.17	ALP111
THORIUM-230	2.38E+00			Work Order: M84111AC 5.7E-01	5.55E-02	PCI_G	Rec Limits:	75	125	-0.1		g	
Batch: 6231048 PLUTONIUM-239/240	L4S1 3.47E+00			Work Order: M84111AC 8.5E-01	8.58E-02	PCI_G	Report DB ID: M84111CS 96%	2.06E+00	2.13E-02	115%	9/21/16 11:02 a	1.1	ALP27
AMERICIUM-241	3.57E+00						Rec Limits:	75	125	0.2		g	
Batch: 6231045 L4SO	L4SX 3.47E+00			Work Order: M841W1AC 8.5E-01	8.58E-02	PCI_G	Report DB ID: M841W1CS 74%	3.74E+00	4.39E-02	93%	9/29/16 08:02 p	1.19	ALP44
AMERICIUM-241	3.57E+00						Rec Limits:	75	125	-0.1		g	
No. of Results: 7	Comments:												



Chain of Custody Record

TestAmerica St. Louis

13715 Rider Trail North
Earth City, MO 63045
Phone (314) 298-8566 Fax (314) 298-8757

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody Record

Sample Check-in List

Date/Time Received: 8-18-14

Container GM Screen Result: (Airloek) 0 ppm Initials [B]
Sample GM Screen Result (Sample Receiving) 0 ppm Initials []

Client: STLOR

SDG #: S194S

SAF #:

NA [B]

Lot Number: J6HT180414

Chain of Custody # 100-91468.1

Shipping Container ID or Air Bill Number: _____

NA [B]

Samples received inside shipping container/cooler/box

Yes [B] Continue with 1 through 4. Initial appropriate response.
No [] Go to 5, add comment to #16.

1. Custody Seals on shipping container intact? Yes [B] No []
2. Custody Seals dated and signed? Yes [B] No []
3. Cooler temperature: _____ °C NA [B]
4. Vermiculite/packing materials is NA [] Wet [] Dry [B]

Item 5 through 16 for samples. Initial appropriate response.

5. Chain of Custody record present? Yes [B] No []

6. Number of samples received (Each sample may contain multiple bottles): 6

7. Containers received: 6x4oz jars

8. Sample holding times exceeded? NA [] Yes [] No [B]

9. Samples have: tape hazard labels custody seals appropriate sample labels

10. Matrix: B A (FLT, Wipe, Solid, Soil) I (Water) S (Air, Niosh 7400) T (Biological, Ni-63)

11. Samples:

B are in good condition are leaking are broken
B have air bubbles (Only for samples requiring no head space) Other _____

12. Sample pH appropriate for analysis requested Yes [] No [] NA [B]

(If acidification is necessary go to pH area & document sample ID, initial pH, amount of HNO₃ added and pH after addition on table)

13. Were any anomalies identified in sample receipt? Yes [] No [B]

14. Description of anomalies (include sample numbers): NA [B]

15. Sample Location, Sample Collector Listed on COC? * Yes [] No [B]

*For documentation only. No corrective action needed.

16. Additional Information: N/A

[] Client/Courier denied temperature check.

[] Client/Courier unpack cooler.

Sample Check-in List completed by Sample Custodian:

Signature: John Bond

Date: 8-18-14

Client Notification needed? Yes [] No [] Date:

By: _____

Person contacted: _____

[X] No action necessary; process as is

Project Manager

Date

8-18-16